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Adjectives without syntactic categories

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Abstract
Elbourne has proposed that future research should investigate the possibility of eliminating syntactic categories from linguistic theory and letting their functions be taken over by independently motivated semantic categories such as semantic types ('A program for eliminating syntactic categories', 2024, *Linguistic Inquiry*). The current article applies this research programme to the case of adjectives. It argues that adjectives should be conceived of as functions from noun denotations to noun denotations (a unique type). Adjectives in predicative position are dealt with by giving a suitable denotation to the copula. Various arguments against this analysis of adjectives are reviewed and dismissed.

Keywords Syntactic categories · Semantic types · Adjectives · Attributive position · Predicative position · Copula · Meaning-dependent grammar

1 Introduction

In previous work (Elbourne 2024), I have proposed that future research should investigate the possibility of eliminating syntactic categories from linguistic theory and letting their functions be taken over by independently motivated semantic categories such as semantic types. The idea is that nouns can be conceived of as lexical items of semantic type ⟨e,t⟩, DPs can be conceived of as items of type ⟨et,t⟩, VPs can be conceived of as items of type ⟨s,t⟩ (where s is the type of events), and so on; if different syntactic categories have different semantic types, then syntactic categories are otiose and can be eliminated, potentially bringing about a great gain in theoretical economy.

This research programme is a branch of something that I would like to call *Meaning-Dependent Grammar*; particular grammars written in this framework will also be so designated.[1] I would view Meaning-Dependent Grammar as encompass-

[1]The allusion is to the claim by Chomsky (1957, 17) that 'grammar is autonomous and independent of meaning'. See Elbourne (2024) for a discussion of Chomsky's arguments for this claim.

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ing any kind of grammar that allows semantic considerations to enter into sentence construction (which is not to say, of course, that the syntax must use *only* semantic considerations). This means that there can in principle be, and have in fact been, different varieties of Meaning-Dependent Grammar: Elbourne (2024) is one and Generative Semantics (Lakoff 1976; McCawley 1968; Lakoff 1972a,b; Postal 1972) was another. The programme could be also imported into other contemporary syntactic theories such as Categorial Grammar (Ajdukiewicz 1935; Lambek 1958; Steedman 2012, 2019). Strictly speaking, then, the research programme pursued in my previous work (Elbourne 2024) and in the present article should be called *Categoriless Minimalist Meaning-Dependent Grammar*, since it is based on Minimalist Syntax and uses the resources of Meaning-Dependent Grammar to attempt to abolish syntactic categories.[2]

The current article applies this research programme to the case of adjectives, which were dealt with only very briefly in Elbourne (2024). It argues that lexical adjectives (and also APs) should be conceived of as being functions from noun denotations to noun denotations. This differs from the currently most popular way of doing things (laid out in Heim and Kratzer (1998), for example), according to which adjectives are of the same semantic type as nouns. This latter theory cannot be correct, of course, if the guiding hypothesis of Categoriless Minimalist Meaning-Dependent Grammar is on the right lines, since that hypothesis says that different syntactic categories have different semantic types (with the exception of harmless overlaps such as that between lexical adjectives and APs).

In an extensional semantics, adjectives, as conceived of in this article, would be of type ⟨et,et⟩. For short, I will call the thesis that adjectives are functions from noun denotations to noun denotations *the ⟨et,et⟩ theory*. In this article I will actually assign adjectives the type ⟨⟨e,it⟩,⟨e,it⟩⟩, where i is the type of time intervals. But different ways of mixing in intensionality would produce different exact types, so in order to avoid prejudging the ultimate result I will talk of 'the ⟨et,et⟩ theory'. I will call the rival theory, according to which adjectives have the same type as nouns, *the ⟨e,t⟩ theory*.

Some readers may be wondering why my basic type for adjectives does not contain a degree argument, given that much work has argued for this (von Stechow 1984; Bierwisch 1989; Kennedy and McNally 2005; Kennedy 2007; and many others). The reason is that it might be easier to maintain a uniform type for adjectives (which is

[2] An anonymous reviewer asks why, given that there is some redundancy between syntactic categories and semantic types, the reduction should not be done by abolishing semantic types. The answer is that, if one abolished semantic types, one would not be able to say that propositions were functions from circumstances of evaluation to truth values, since to say that these functions must take *this* type of input (circumstances of evaluation) and give back *this* type of output (truth values) is, *ipso facto*, to assign them a semantic type. And there are good philosophical reasons for wanting propositions to be functions from circumstances of evaluation to truth values (Stalnaker 1970). One could point to the alternative tradition that takes propositions to be ordered tuples of individuals and properties (Russell 1910; Tye 1978; McKay 1981). But analogous considerations arise there. Take the simplest kind of case, whereby *Fido is cute* is represented by ⟨Fido, cuteness⟩. This proposition will be true at a circumstance of evaluation *c* if and only if Fido instantiates the property of cuteness at *c*. We need the second member of the ordered pair to be a property and the first member to be a type of thing that can instantiate properties (such as an individual). Here too, then, we need to ensure that propositions are made up of entities with particular semantic types, which implies a role for semantic types in our grammar.

desirable given the wider goals of this project) if I adopt the rival tradition, sometimes called *delineation semantics*, according to which adjectives do not take degree arguments (Klein 1980; van Benthem 1982; Keenan and Faltz 1985; Larson 1988; van Rooij 2011; Burnett 2014, 2017). Further discussion of this issue can be found in Sect. 4.6.

As just hinted, the semantics in this article is simplified in that it does not take account of intensionality beyond a simple treatment of tense. I anticipate that, in a more fully developed Meaning-Dependent Grammar, possible (and perhaps even impossible) worlds or situations will have to be added in order to deal with various kinds of embedded sentence and other intensional phenomena (Hintikka 1969; Lewis 1970; Montague 1970a,b; Barwise and Perry 1983; and many others).[3] But these topics are orthogonal to my current concerns.

This article has narrowly defined goals. Crucially, it does not attempt to solve all syntactic and semantic problems associated with adjectives. That would hardly be feasible. Its aim is just to show that classifying adjectives as lexical items of type ⟨et,et⟩ (or an intensional variant) in a Meaning-Dependent Grammar is possible and promising: that is, it will show that immediate compositional problems (such as adjectives in predicative position) can be solved and that no other known arguments against the ⟨et,et⟩ theory are successful. The idea is that work on the syntax and semantics of adjectives can proceed in this framework at least as well as it can in others.

The article is structured as follows: Sect. 2 lays out a Meaning-Dependent Grammar based closely on that found in Elbourne (2024), into which the current analysis of adjectives will have to fit; Sect. 3 lays out the basics of the ⟨et,et⟩ theory; Sect. 4 sets out and replies to some criticisms that have been made of this theory; and Sect. 5 concludes.

2 A meaning-dependent grammar

This section lays out a meaning-dependent grammar based closely on the one found in Elbourne (2024); the presentation is largely an abbreviation of what is found in that article, which should be consulted for further details on most points. The one significant change from Elbourne (2024) (apart from a lexical entry for the copula) is that a slightly more sophisticated treatment of tense has been added.[4] The grammar is based closely on Stabler's Minimalist Grammars syntactic framework (Stabler 1997, 2011, 2013; Elbourne 2016).

[3] Another possibility, mentioned in footnote 2, is that propositions should be construed as ordered tuples of individuals and properties (Russell 1910; Tye 1978; McKay 1981; and many others). This possibility should be investigated for use in the current project. My impression is, however, that work in this tradition is less fully integrated with the demands of compositionality than work in the rival tradition that sees propositions as unstructured sets of worlds or situations. (But see Elbourne (2011, 104–107) and Pickel (2019) for some first steps towards integration.).

[4] The treatment of tense is still not very sophisticated, however. In particular, the current treatment does not allow fine-grained control when it comes to different predicates in a sentence being interpreted with respect to different times. This would almost certainly necessitate complications that are not worth their while in the current context, given that these issues are largely orthogonal to the ones I am trying to deal with. See Musan (1997), Kusumoto (2005), and Keshet (2010) for relevant discussion.

2.1 Syntax

The grammar will be a *directional minimalist grammar* (i.e. one that allows linear order to be read off from trees and taken into account in the formulation of Merge; Stabler 2011, 635).

2.1.1 Features

There are three kinds of features: semantic, phonological, and syntactic.[5] The following abbreviations will be adopted: (donkey) is the semantic value of the word *donkey*; a conventional spelling in phonological slashes, '/donkey/', represents the phonological features; 'donkey' alone, without quotation marks, summarizes the semantic and phonological features; a double colon, '::', separates the different kinds of features of one word in lexical entries and trees.

There are three kinds of syntactic features:

(1) *Selector features*. A feature E_L indicates that a constituent needs to combine with another constituent to its left via External Merge. Likewise, with the obvious change, for E_R. Occasionally, a selector feature is annotated with a semantic type, as with the $E_{L,\langle eit,it\rangle}$ feature that appears on little v. (See (8).) In that case, something of the indicated type must be merged.

(2) *Probe features*. Features written with various forms of the letter *i* are triggers of movement (Internal Merge). They include a subscript representation of the semantic type of the item to be moved: I_σ, i_σ, and $\mathcal{I}_\sigma$ for a type σ. They include the following varieties:

   a. *Strong features* are written with capital letters: I_σ. They target constituents that have phonological features and produce overt movement, which is to say movement of all the features of the constituent concerned.
   b. *Weak features* are written with lower-case letters: i_σ. They produce covert movement, which is to say movement of only the semantic and syntactic features of the constituent concerned.
   c. *Reconstruction features* are written with calligraphic capitals: $\mathcal{I}_\sigma$. They target constituents that have phonological features and produce movement of phonological features only; syntactic and semantic features are left in the base position.

(3) Features interpreted by syncategorematic rules, restricted in the current system to those that characterize λ-operators and traces.

Selector features and probe features are descendants of the features variously called c-selectional features (Adger 2003, 96), edge features (Chomsky 2008, 139), selec-

[5] Actually, it is a slight simplification to say that the features called phonological here are phonological. Certain morphemes, like English past tense, appear in very different phonological garb in different environments, meaning that any placeholder put in at the left-hand side of their lexical entries, as I do in Sect. 2.1.4, will not be phonological. And referential indices, which I introduce in Sect. 3.5, will not be phonologically realized. These latter, at least, can nevertheless be conceived as being part of the form of the words in question, in a slightly broader sense than that referring to mere phonological form. There are issues here, but I will not explore them in this article.

tor features (Stabler 2011; Elbourne 2016), and trigger features (Collins and Stabler 2016, 62) by other Minimalist authors.

Goal features are not used in the current system. Selector features and probe features cannot be interpreted by the semantics and will sometimes be lumped together and referred to as *uninterpretable*. Features interpreted by syncategorematic rules are *interpretable*, of course.

2.1.2 Trees and sentences

Projection, headedness, and the notion of specifier will not play a role in the new grammar as currently formulated.

The role of a generative grammar is seen as being to generate sentences, where a *sentence*, in the current framework, is defined as a structure of type ⟨i,t⟩ that does not contain any uninterpretable features.

The grammar is set up in such a way that any object produced by it in the course of a derivation will contain at most one node that bears uninterpretable syntactic features. This node will be called the *driver*, since the features on it determine the direction of the computation.

2.1.3 Rules

The following abbreviations will be used in the presentation of the rules. $\tau[\alpha]$ denotes a tree whose driver has a sequence of uninterpretable syntactic features whose first element is α. Given a structure $\tau[\alpha]$, τ denotes the result of erasing feature α. Given a tree τ_1 with subtree τ_2, $\tau_1\{\tau_2 \mapsto \tau_3\}$ is the result of replacing τ_2 with τ_3 in τ_1. ϵ indicates an empty sequence. Given a tree τ, $|\tau|$ indicates the syntactic features of τ. τ_σ indicates a tree of semantic type σ. The following rules are part of the grammar:

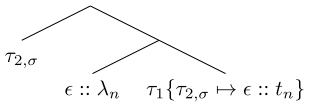
(4) *External Merge.* Since we are operating with a directional minimalist grammar, there are two cases. Occasionally, an E feature is annotated with a semantic type, in which case something of that type must be merged; but mostly the choice of type is free at the moment of Merge and is controlled only indirectly by (13) (the Principle of Interpretability).

a. $merge(\tau_1[\mathrm{E_R}], \tau_2) =$ 

b. $merge(\tau_1[\mathrm{E_L}], \tau_2) =$ 

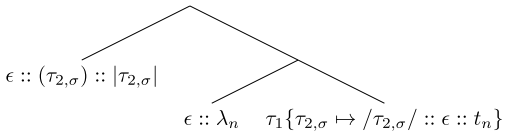
(5) *Internal Merge*, or movement, takes place when an I_σ (strong), i_σ (weak), or $\mathcal{I}_\sigma$ (reconstruction) probe feature is contained in a tree and attracts to it a constituent of type σ. In the current grammar, movement only takes place when there is exactly one constituent in the tree that is of the type and that has the features specified by the probe feature: so i_σ requires something of type σ with semantic features, and so on. Since there are three types of probe features, there are three cases:

a. Internal Merge applies to a tree $\tau_1[\mathrm{I}_\sigma]$ containing a subtree $\tau_{2,\sigma}$ as follows:



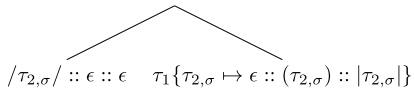
In this case, all the features of the subtree $\tau_{2,\sigma}$ are moved and a trace of type e is left in the base position. The feature I_σ in τ_1 is deleted.

b. Internal Merge applies to a tree $\tau_1[\mathrm{i}_\sigma]$ containing a subtree $\tau_{2,\sigma}$ as follows:



This is covert movement, since we are dealing with a weak (i_σ) probe feature. The semantic and syntactic features of the relevant constituent of type σ raise, leaving behind the phonological features and a trace. The i_σ feature in τ_1 is deleted.

c. Internal Merge applies to a tree $\tau_1[\mathcal{I}_\sigma]$ containing a subtree $\tau_{2,\sigma}$ as follows:



This is movement with total reconstruction. The phonological features of the relevant constituent move, but the semantic and syntactic features remain in the base position. The $\mathcal{I}_\sigma$ feature in τ_1 is deleted.

The following principle will govern the operation of External Merge (Collins and Stabler 2016, 64):

(6) *Argument Interpretability*
The constituent selected for by a selector feature must not contain any uninterpretable syntactic features.

Covert movement will be constrained by Fox's (2000, 23) Scope Economy constraint:

(7) *Scope Economy*
Covert scope-shifting operations that are not forced for type considerations must have a semantic effect.

The movement rule (5b) counts as a covert scope-shifting operation.

2.1.4 Lexical entries

Entries in the list in (8) have the following form: 'phonological features :: semantic features :: syntactic features'. Optional syntactic features are given in angle brackets: $\langle\alpha\rangle$. The others are compulsory. In subscripted types, s is the type of events and

i is the type of time intervals. The types of the various denotations are written on the right. (This is for convenience's sake; types are inherent properties of the objects concerned and do not have to be stipulated separately.) I have added a lexical entry for BE to the entries given in Elbourne (2024). Some morphemes, such as BE and PAST, appear in different phonological guises in different environments; I have written the names of these morphemes in capital letters and put them in the place of phonological features, for convenience, even though these names are not strictly speaking phonological features.

(8)

/Fido/ :: $\lambda f_{\langle e,it\rangle}.\lambda t.f(o)(t)$ :: ϵ	$\langle$eit,it$\rangle$
/someone/ :: $\lambda f_{\langle e,it\rangle}.\lambda t.\exists x(\text{person}(x)(t)\ \&\ f(x)(t))$ :: ϵ	$\langle$eit,it$\rangle$
/everyone/ :: $\lambda f_{\langle e,it\rangle}.\lambda t.\forall x(\text{person}(x)(t) \rightarrow f(x)(t))$ :: ϵ	$\langle$eit,it$\rangle$
/every/ :: $\lambda f_{\langle e,it\rangle}.\lambda g_{\langle e,it\rangle}.\lambda t.\forall x(f(x)(t) \rightarrow g(x)(t))$ :: E_R	$\langle$eit, $\langle$eit,it$\rangle\rangle$
/some/ :: $\lambda f_{\langle e,it\rangle}.\lambda g_{\langle e,it\rangle}.\lambda t.\exists x(f(x)(t)\ \&\ g(x)(t))$ :: E_R	$\langle$eit, $\langle$eit,it$\rangle\rangle$
/a/ :: $\lambda f_{\langle e,it\rangle}.\lambda g_{\langle e,it\rangle}.\lambda t.\exists x(f(x)(t)\ \&\ g(x)(t))$ :: E_R	$\langle$eit, $\langle$eit,it$\rangle\rangle$
/donkey/ :: $\lambda x.\lambda t.\text{donkey}(x)(t)$ :: ϵ	$\langle$e,it$\rangle$
/woman/ :: $\lambda x.\lambda t.\text{woman}(x)(t)$ :: ϵ	$\langle$e,it$\rangle$
/cute/ :: $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)\ \&\ \text{cute}(x)(t)$ :: $\langle E_R\rangle$	$\langle$eit,eit$\rangle$
/dance/ :: $\lambda R_{\langle i,it\rangle}.\lambda e.\lambda t.\text{dance}(e)\ \&\ R(\text{CUL}(e))(t)$ :: E_R	$\langle$iit,sit$\rangle$
/inspect/ :: $\lambda R_{\langle i,it\rangle}.\lambda x.\lambda e.\lambda t.\text{inspection}(e)\ \&\ \text{Theme}(e)(x)\ \&\ R(\text{CUL}(e))(t)$ :: $E_R E_R$	$\langle$iit,$\langle$e,sit$\rangle\rangle$
BE :: $\lambda R_{\langle i,it\rangle}.\lambda G_{\langle eit,eit\rangle}.\lambda x.\lambda t.\exists t'(R(t')(t)\ \&\ G(\lambda y.\lambda t''.\top)(x)(t'))$ :: $E_R\ E_R\ E_{L,\langle eit,it\rangle}$	$\langle$iit,$\langle\langle$eit,eit$\rangle$,eit$\rangle\rangle$
PAST :: $<$ :: ϵ	$\langle$i,it$\rangle$
/beautifully/ :: $\lambda F_{\langle s,it\rangle}.\lambda e.\lambda t.F(e)(t)\ \&\ \text{beautiful}(e)$ :: E_R/E_L	$\langle$sit,sit$\rangle$
ϵ :: $\lambda F_{\langle s,it\rangle}.\lambda x.\lambda t.\exists e(F(e)(t)\ \&\ \text{Agent}(e)(x))$ :: $E_R\ E_{L,\langle eit,it\rangle}\ \langle i_{\langle eit,it\rangle}\rangle\ \langle i_{\langle eit,it\rangle}\rangle$	$\langle$sit,eit$\rangle$
/not/ :: $\lambda p_{\langle i,t\rangle}.\lambda t.\neg p(t)$ :: ϵ	$\langle$it,it$\rangle$

Metalanguage expressions like 'donkey$(x)(t)$' are to be read 'x is a donkey at t', and so on. Strictly speaking, the meanings of these lexical items are given in a higher-order formal language with λ-extraction that is itself subject to (for example) model theoretic interpretation.[6] (So, 'donkey' as it appears in meanings is a constant, of type $\langle$e,it$\rangle$, in this language.) But the meanings should be clear enough as they stand.

In a slight change from the system in Elbourne (2024), the E_R feature on *cute* is optional. This is to enable it to combine with the copula, which has its own selector features, without violating (6) (Argument Interpretability). The E_R feature will be needed, however, when *cute* is in attributive position and must combine with a noun. One result of this change is that little v (the penultimate entry in the list) and BE come with $E_{L,\langle eit,it\rangle}$ features to ensure that the right type of thing is merged as the subject; if the E_L features in question did not have an annotation for type, it would be possible to merge an adjective (without an E_R feature) with the structures that little v and BE create, which are of type $\langle$e,it$\rangle$. Examples will be seen in Sects. 2.3 and 3.

[6] The basic strategy is taken over from Montague (1973).

Little v is shown in simplified form: an optional raft of features designed to raise the subject from a vP-internal position in the presence of negation has been omitted.[7]

Meanwhile, the symbol '$<$' in the lexical entry of the past-tense morpheme designates a function of type ⟨i,it⟩ such that $<(t)(t')$ iff t occurred before t'. For any event e, 'CUL(e)' is the culmination of e, which is to say the last temporal point at which e obtains.

2.2 Semantics (Heim and Kratzer 1998)

The grammar will contain the following semantic interpretation rules:

(9) *Functional Application*
If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then, for any assignment g, α is in the domain of $[\![\ ]\!]^g$ if both β and γ are, and $[\![\beta]\!]^g$ is a function whose domain contains $[\![\gamma]\!]^g$. In that case, $[\![\alpha]\!]^g = [\![\beta]\!]^g([\![\gamma]\!]^g)$.

(10) *Predicate Abstraction*
For all indices n and assignments g, $[\![\epsilon :: \lambda_n \ \ \alpha]\!]^g = \lambda x.\, [\![\alpha]\!]^{g^{x/n}}$.

(11) *Traces*
If α is a trace, g is a variable assignment, and $n \in \mathrm{dom}(g)$, then $[\![\alpha_n]\!]^g = g(n)$.

(12) *Lexical Terminals*
If α is a lexical item, then, for any assignment g, $[\![\alpha]\!]^g$ is given by the semantic features of α.

Variable assignments are functions from the natural numbers to individuals, as usual. $g^{x/n}$ is the variable assignment that is just like g, except that n is mapped to x.

The grammar will also make use of the following principle (Heim and Kratzer 1998):

(13) *Principle of Interpretability*
All nodes in a phrase structure tree must be in the domain of the interpretation function $[\![\ ]\!]$.

The interpretation of individual lexical items is given in (8).

As remarked in Sect. 2.1.2, the grammar is meant to generate sentences, where a sentence, in the current framework, is a structure of type ⟨i,t⟩ that does not contain any uninterpretable features. The denotations of these structures, being functions from time intervals to truth values, will by convention be applied to the time of utterance to obtain a truth value for an utterance on any given occasion.

2.3 An example

Since not much has been published so far on the current variety of Meaning-Dependent Grammar, and since one or two minor changes to the system in Elbourne

[7] I will continue to use traditional syntactic category labels for convenience sometimes, as I just did; but such things have no official place in the theory. Similarly, in (18) and elsewhere I use '(v)' as an abbreviation for the semantics for little v given in (8).

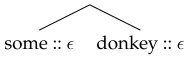
(2024) need illustration, I will give a worked example that does not involve adjectives before we get down to the main business of this article. I will give derivations for each scopal possibility of the following sentence, whose structure is, moreover, almost identical to that of (55), one of our later example sentences.[8]

(14) Every woman inspected some donkey.

The creation of structure in this system will be constrained by (6) (Argument Interpretability), (7) (Scope Economy), (13) (the Principle of Interpretability), and by the details of the various kinds of Merge laid out in (4) and (5), and in particular by the requirement that Merge of whatever kind be triggered by a syntactic feature. Although the Principle of Interpretability will not strictly speaking be applied until the end of the derivation, we will bear it in mind as we go along as a useful diagnostic of what is possible.

With these principles in mind, we look at the list of lexical entries in (8) and note that the only pairs of items that are capable of combining there, assuming that the verb *inspect* will be used, are *some* and *donkey* (and other determiner–noun combinations), *inspect* and PAST, and *cute* and a noun. Let us forego using adjectives for now. But we combine *some* and *donkey* by External Merge, deleting the E_R feature on *some*:

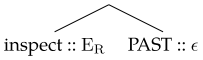
(15)



The resulting structure is of type ⟨eit,it⟩. It would be able to take another noun (type ⟨e,it⟩) as its argument if structure was constrained only by types; but fortunately it is prevented from doing so by its lack of syntactic features.

We also combine *inspect* and PAST by External Merge, deleting the first E_R feature on *inspect*:

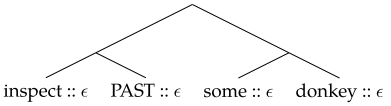
(16)



The resulting structure is of type ⟨e,⟨s,it⟩⟩. Nothing in this system takes things of this type as an argument. The only thing of type e that it could take as an argument is a trace, which will be obtained after we merge the two structures we have now created and move the quantifier phrase.

Combining 15 and (16) by External Merge produces the following structure:

(17)

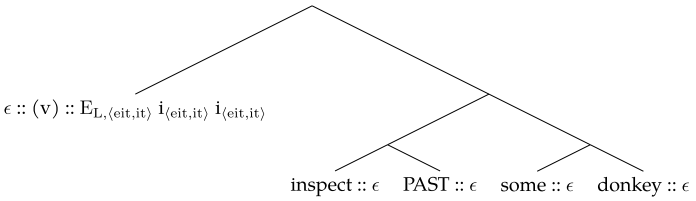


The last E_R feature on *inspect* has been deleted. The resulting structure will be of type ⟨s,it⟩ when the quantifier phrase has been replaced with a trace. There are no items of type s in this system that it could take as an argument. There are two kinds

[8] It was claimed in footnote 7 of Elbourne (2024) that both readings of sentences like (14) could be obtained by the system in that article, but very few details were given.

of things that take things of type ⟨s,it⟩ as arguments: manner adverbs, like *beautifully*; and little v. To keep things simple, let us forego the opportunity of merging an adverb at this juncture. Instead, we introduce little v with both the optional $i_{\langle eit,it\rangle}$ features shown in (8). The resulting structure is as follows:

(18)

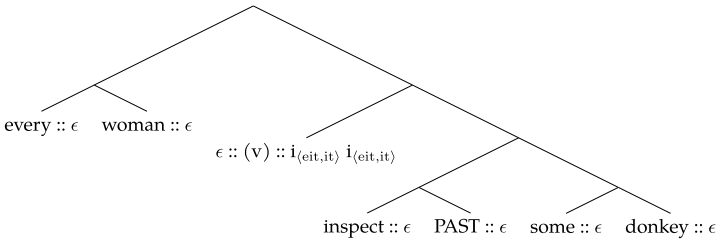


The E_R on little v has been deleted. This structure will be of type ⟨e,it⟩ when the quantifier phrase has been replaced with a trace. If there were no annotation for type on the E_L feature, it would be possible to combine (18) with the version of *cute* (or, by extension, another adjective) that does not have its optional E_R feature. (See (8).) But, as things are, the right type of sister for (18) is ensured.

It is worth remarking in passing that, even though the headline claim of the current framework is to replace syntactic categories with semantic types, annotation for semantic type is not required for purposes of External Merge in the current fragment, except in the cases of little v and BE. Otherwise, the right shape for any tree is ensured by the Principle of Interpretability working on its types and other semantic properties. When one thinks about the omnipresence of syntactic categories in features triggering External Merge in previous explicitly formulated versions of Minimalist Syntax (e.g. Collins and Stabler 2016), one sees that the reduction of used information in the current framework is really quite considerable. Hopefully, some way will eventually be found to eliminate the type annotations on little v, BE, and the various features that trigger Internal Merge.

Returning to the derivation, a phrase [every woman] is easily constructed along the same lines as [some donkey] and merged in above little v:

(19)

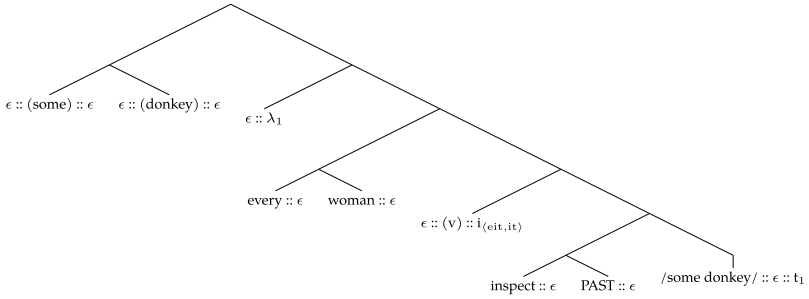


The $E_{L,\langle eit,it\rangle}$ feature on little v is deleted.

Little v is still the driver. Its next syntactic feature mandates covert movement of an item of type ⟨eit,it⟩. There are two such items in the tree: the subject and the object. Which one should be moved? The answer follows easily from (7) (Scope Economy): moving the subject at this juncture would be a trivial short-distance movement with no semantic effect. We have to move the object, then.

We do so and obtain the following structure, deleting the first $i_{\langle eit,it\rangle}$ feature on little v:

(20)



This structure is of type ⟨i,t⟩, the first structure of this type that we have encountered in this derivation. Furthermore, the only uninterpretable syntactic feature that it contains, the $i_{\langle et,t\rangle}$ feature on little v, was optional and did not have to be included. We predict, then, that the current system generates a structure exactly like (20) except that it contains no uninterpretable syntactic features. Such a structure would satisfy the requirements for being a *sentence* in the current system, as defined in Sect. 2.1.2: an object of type ⟨i,t⟩ that contains no uninterpretable syntactic features, which it is the business of a generative grammar to generate. And I welcome this prediction. The structure just described (which I will not display in a separate diagram, since it is almost identical to (20)) is the representation of the inverse scope reading of (14) (*Every woman inspected some donkey*) in the current framework. Note how all the phonological, semantic, and syntactic features occupy suitable positions, ready for interpretation by their respective interfaces: there is no separate level of LF in the current framework. (I assume that the morpheme PAST is spelled out appropriately in a post-syntactic process that I will not attempt to describe in this article.) A straightforward calculation in the current system shows that this structure denotes the proposition in (21):

(21) $\lambda t.\exists x(\text{donkey}(x)(t)\ \&\ \forall y(\text{woman}(y)(t) \rightarrow \exists e(\text{inspection}(e)\ \&\ \text{Theme}(e)(x)\ \&\ <(\text{CUL}(e))(t)\ \&\ \text{Agent}(e)(y))))$

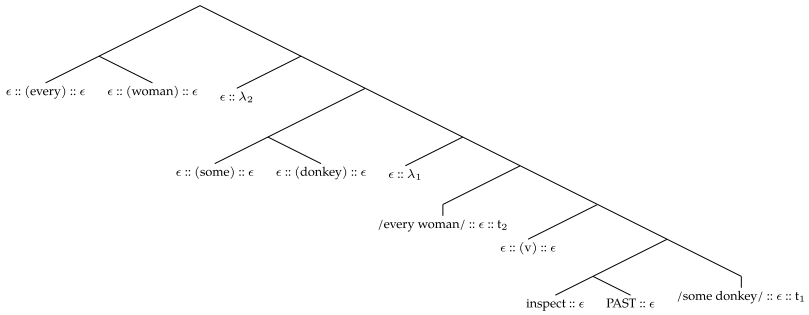
This is intuitively adequate.

As described in Elbourne (2024), this system is set up in such a way as to provide a higher subject position when something in the structure (such as negation or an auxiliary) makes one visible and necessary. But otherwise, as in the current example, the subject stays in what some might think of as the specifier of vP (not that such terms have any official recognition in the current system). I do not know of any good evidence to the effect that a higher subject position is present in English in sentences that do not contain items like negation and auxiliaries and so have set up the grammar in the current article accordingly; but this choice is not intrinsic to Meaning-Dependent Grammar and could be modified if necessary.

As things stand in the current derivation, there is still one $i_{\langle eit,it\rangle}$ feature remaining on little v. It mandates covert movement of a constituent of type ⟨eit,it⟩. Which one? The answer follows once more from (7) (Scope Economy): moving the higher copy of *some donkey* would be a trivial, short-distance movement with no semantic effect. We have to move *every woman*, then. (Note that the lower copy of *some donkey* is of

type e and thus cannot be targeted by the current operation.) We obtain the following structure:

(22)



A straightforward calculation in the current system shows that this tree has the following truth conditions:

(23) $\lambda t.\forall y(\text{woman}(y)(t) \rightarrow \exists x(\text{donkey}(x)(t)\ \&\ \exists e(\text{inspection}(e)\ \&\ \text{Theme}(e)(x)\ \&\ <(\text{CUL}(e))(t)\ \&\ \text{Agent}(e)(y))))$

These truth conditions are intuitively adequate. They represent the surface scope of (14) (*Every woman inspected some donkey*). The truth conditions for the inverse scope were given in (21). So the current system can obtain both the surface and the inverse scope for this example, without the use of syntactic categories.

3 The ⟨et,et⟩ theory

3.1 Attributive position

The ⟨et,et⟩ theory seems to have occurred independently and more or less simultaneously to Clark (1970), Lewis (1970), Montague (1970a), and Parsons (1970).[9] This is not too surprising, since it is a very natural theory. It is, of course, particularly natural when dealing with adjectives in attributive position (when they are sisters of nouns, or sisters of adjective–noun combinations, and so on, recursively): the adjective takes the noun (or adjective–noun combination) as an argument and maps it to something of the same type as a noun (or adjective–noun combination); the new object thus created can be modified by a further adjective or taken as an argument by a determiner, as the case may be.

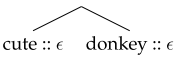
Here are some representative lexical entries, repeated from (8).

(24) a. /donkey/ :: $\lambda x.\lambda t.\text{donkey}(x)(t) :: \epsilon$
b. /cute/ :: $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)\ \&\ \text{cute}(x)(t) :: \langle E_R\rangle$

[9] Montague (1970a) mentions Hans Kamp as being another prominent early proponent of the theory, but without citing any paper. Kamp (1975) later made an influential recantation and began to support the ⟨e,t⟩ theory.

In the syntax, these will combine with each other easily by External Merge, assuming that the optional feature E_R is present on the adjective:

(25)



The feature E_R is deleted when Merge takes place, in accordance with (4a). A straightforward calculation shows that the semantic value of this constituent is the following:

(26) $\lambda x.\lambda t.\text{donkey}(x)(t)\ \&\ \text{cute}(x)(t)$

This is of type ⟨e,it⟩, as desired.

The main alternative, of course, is to say that adjectives are of type ⟨e,t⟩ or an intensionalized variant (Kamp 1975)—or at least to say that most of them are, since hardly anyone maintains that non-subsective adjectives like *alleged* and *former* are of this type.[10] This theory works well with adjectives in predicative position, since it is easy enough to come up with a denotation for the copula that combines with something of type ⟨e,t⟩. (I will stop adding 'or an intensionalized variant' for the rest of this paragraph.) But it faces problems with adjectives in attributive position, since both nouns and adjectives will be of type ⟨e,t⟩ and thus cannot combine with each other by Functional Application. The standard solution here is to posit a special rule of semantic composition, called Predicate Modification by Heim and Kratzer (1998), that will take two sisters of type ⟨e,t⟩ and give back the characteristic function of the intersection of the two sets defined by their meanings. The theory advanced in the current article does without Predicate Modification and similar rules, of course; and it also gives a single semantic type to adjectives, as opposed to saying that some of them are of type ⟨e,t⟩ and some of them are of type ⟨et,et⟩. This comes at the cost of a slightly complicated denotation for the copula, to be laid out presently. This is a gain in terms of theoretical economy in itself in my book; but I recognize that reasonable people could differ here and, since the major gain in economy on the table is abolishing autonomous syntactic categories, I will not press the point.[11]

3.2 Predicative position

The ⟨et,et⟩ theory will face a question when it comes to adjectives in predicative position (after the copula *is*). How are they to be interpreted in that position? There are various possibilities here, some of which I will discuss shortly, but the one that seems best motivated to me is the one that follows directly from the standard methodology of compositional semantics: if the copula looks like it has to combine with something of

[10] A non-subsective adjective is one that, when combined with a noun N, does not necessarily produce a constituent whose denotation in set-theoretic terms is a subset of the denotation of N. See Sect. 3.4 for further discussion. For historical completeness, we should note that Bartsch (1972) proposed that adjectives in attributive position were of type ⟨et,et⟩, whereas (apparently the same) adjectives in predicative position were of type ⟨e,t⟩. I believe that mixed theories of this kind face a *prima facie* problem with theoretical economy.

[11] Meanwhile, modifiers of adjectives like *too*, *very*, and *so* will be of type ⟨⟨eit,eit⟩,⟨eit,eit⟩⟩ according to the current theory. This is another unique type, but I have nothing further to say about these words here.

type ⟨et,et⟩, we will simply give it a lexical entry that enables it to do so, a suggestion made (but not ultimately endorsed) by Heim and Kratzer (1998, 67).

My denotation for the copula has already been given in (8). Here are some lexical entries repeated from there that will enable us to analyse an example sentence:

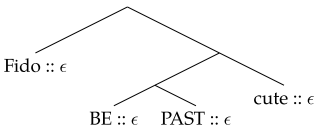
(27) a. /Fido/ :: $\lambda f_{\langle e,it\rangle}.\lambda t.f(o)(t) :: \epsilon$
b. /cute/ :: $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)$ & $\text{cute}(x)(t) :: \langle E_R\rangle$
c. BE :: $\lambda R_{\langle i,it\rangle}.\lambda G_{\langle eit,eit\rangle}.\lambda x.\lambda t.\exists t'(R(t')(t)$ & $G(\lambda y.\lambda t''.\top)(x)(t'))$
:: $E_R\ E_R\ E_{L,\langle eit,it\rangle}$
d. PAST :: $< :: \epsilon$

Let us look at (28):

(28) Fido was cute.

We will have to use the version of *cute* without the optional feature E_R, since the adjective will be taken as argument by BE (strictly, the combination [BE PAST]), which has its own syntactic features. If we left the feature on *cute*, we would violate (6) (Argument Interpretability). With that duly noted, a straightforward derivation in the current system produces the following syntactic tree:

(29)



And a straightforward calculation produces the following truth conditions.[12]

(30) $\lambda t.\exists t'(< (t')(t)$ & $\text{cute}(o)(t'))$

These truth conditions are intuitively adequate.

As Heim and Kratzer (1998, 67) point out, this solution raises the question of what is happening in sentences like (31):

(31) Fido is a dog.

If *is* expects something of type ⟨eit,eit⟩ as an argument, how is this compatible with it combining with *a dog*?

There are various possible solutions to this problem. Before we examine some of them, let us note briefly that it is not as if the rival ⟨e,t⟩ theory has a particularly elegant story to tell at this point. Given the normal semantics for quantifier phrases like *a dog* (type ⟨et,t⟩ in extensional terms, ⟨eit,it⟩ in the current framework), there are tricky questions about how the semantics of (31) works out with this theory too. Indeed Heim and Kratzer (1998, 61–63) operate on the assumption that both the copula and the word *a* are semantically vacuous in (31), meaning that *a* would have to be ambiguous between vacuity and its normal quantificational meaning.

[12]The only matter to note is that the calculation relies at one point on the principle that $(p$ & $\top)$, where '$\top$' is the truth value True, is equivalent to p. That is the role of the '$\top$' in the denotation of BE. 'o' is an individual constant referring to Fido, of course.

In this light, then, I trust that it will not be too shocking if I suggest an ambiguity in the word *a* on behalf of the ⟨et,et⟩ theory too. We can just say that the word *a* has a meaning (in addition to its quantificational meaning) that converts meanings of type ⟨e,it⟩ into suitable meanings of type ⟨eit,eit⟩. The following would suffice:

(32) $\lambda f_{\langle e,it\rangle}.\lambda g_{\langle e,it\rangle}.\lambda x.\lambda t.g(x)(t)\ \&\ f(x)(t)$

This meaning is of type ⟨eit,⟨eit,eit⟩⟩, a unique type in the current system (not to be confused with the suggested semantic type for [BE PAST], which is ⟨⟨eit,eit⟩,eit⟩); it converts noun meanings into meanings of the same type and overall shape as adjective meanings. In particular, assuming that *dog* has the meaning in (33a), *a dog* would thereby have the meaning in (33b):

(33) a. $\lambda x.\lambda t.\mathrm{dog}(x)(t)$
b. $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)\ \&\ \mathrm{dog}(x)(t)$

This, it can be seen, is precisely parallel to the meaning of *cute* in (27b), which means that BE can operate on it and produce an appropriate meaning for (31).[13,14]

Another solution to the problem posed by (31) was suggested by Montague (1973), who said that we should keep the quantificational semantics of *a* and analyse *is* as the *is* of identity (as in *The Morning Star is the Evening Star*), meaning that the sentence comes out to mean something like, 'There is an individual x such that x is a dog and x is identical to Fido.' Strange as it may seem at first hearing, this entails and is entailed by (31) and thus seems to be a truth-conditionally adequate analysis. As possible support for this theory, I would add that there are sentences that look as if they have the same structure as (31) that involve other determiners. Take Schiffer's (1992, 501) case of the Morning Dog and the Evening Dog. Ralph sees a certain dog at a certain time and place every morning and sees a certain dog at a certain time and place every evening. He believes that they are different, but it turns out that they are the same dog, called Fido. When he realizes this, we might imagine him saying (34):

(34) Fido was both dogs.

(I should clarify that Schiffer's interest in this scenario is quite different; he does not talk about (34).) Add in one more relevant occasion (the Luncheon Dog, perhaps) and we can imagine Ralph saying (35):

(35) Fido was every dog.

[13] It is possible that a phonologically null version of this morpheme, or a corresponding type-shifting process, is involved in those languages in which it is possible to combine a copula directly with an apparently bare noun, as in French *Il est professeur* (literally 'He is teacher', i.e. 'He is a teacher'). Since these nouns would thereby come to acquire the type of adjectives, it is tempting to adduce in support of this theory the fact that nouns in this position in French (but not in any other position) can be combined with adjective-modifiers like *très* ('very'): *Il est très professeur* means something like 'He is very teacherly' (Lauwers 2009). But this construction is subject to extremely complex constraints and cannot be dealt with adequately here; de Swart et al. (2007) is a good entrée into the literature on this topic.

[14] Meanwhile, note that the new meaning for *a dog* in (33b) cannot take any nouns (type ⟨e,it⟩) as arguments because it does not have any syntactic features to enable it to do so. The same goes for quantifier phrases and proper names.

(35) presumably has to be quantificational and (34) might very well be; so we have parallels for Montague's (1973) analysis of (31). The theory has been revived for comparable examples in French by Beyssade (2011).

There are clearly some interesting and potentially viable hypotheses on hand when it comes to analysing (31) under the current theoretical assumptions. I will not attempt to decide between them now but will leave them for future research.

Returning to (28) (*Fido was cute*) and the tree in (29), I should briefly mention the possibility that constructions like (28) contain some version of little v. Although little v is perhaps most frequently invoked as a means to add in an Agent, researchers have sometimes suggested that it comes in different flavours. Chomsky (2013, 43, footnote 29), for example, suggests that there are at least two: one flavour would deal with transitive and unergative verbs, while a second one would handle unaccusatives and passives; and other authors such as Folli and Harley (2007) expand the list still more. If there is a version of little v in (28), it would presumably take [[BE PAST] cute] as its argument. If we assume that this flavour of little v would be of type ⟨sit,eit⟩, like the one I list in (8), then presumably [BE PAST] would be of type ⟨⟨eit,eit⟩,sit⟩, with corresponding consequences for BE. This could presumably all be managed, if necessary, but I do not see any need to spell out this alternative any further, for in fact I know of no good evidence to suggest that there is a version of little v in (28) and am inclined to conclude that there is no such thing. I am joined in this conclusion, I am pleased to note, by den Dikken (2006, 23–24,29,63). I do not know of any author who has argued in detail that constructions like (28) contain little v; and Maienborn (2005) argues convincingly that there are no event variables in play in these sentences.

Let us move on to examine a completely different approach to (28) (*Fido was cute*). This is a theory that is consistent with the ⟨et,et⟩ theory but that lets the copula take an argument of type ⟨e,t⟩ instead of type ⟨et,et⟩. Montague (1970a, 205) interprets *Fido was cute* and similar sentences by means of a special interpretation rule (F_{17}) that supplies a predicate that is true of every individual and, in effect, lets *cute* apply to that. So *Fido was cute* comes to mean something like 'Fido was a cute individual' or 'Fido was a cute entity'. This is all done in the semantics. Later authors, working in the context of theories that eschew construction-specific interpretation rules but that (perhaps not coincidentally) allow phonologically null morphemes, have sometimes reinterpreted Montague as proposing that *cute* in (28) is the sister of a phonologically null noun ENTITY, with a corresponding interpretation (Morzycki 2015, 30); the same thing is also suggested (but not endorsed) by Heim and Kratzer (1998, 68). Since I also wish to do without construction-specific interpretation rules, I will consider this later version of the theory.

This approach seems to overgenerate. It predicts, for example, that (36) will be grammatical and mean 'Joe is a former entity' (Heim and Kratzer 1998; Morzycki 2015):

(36) *Joe is a former.

It might seem very odd to say that Joe is a former entity, and we might wonder how he might possibly fulfil this condition; but the point is that we can intuitively appreciate this meaning and intuitively appreciate that (36) does not have it. Similarly,

in the absence of very stipulative constraints on where this null noun ENTITY can appear, this approach predicts that (37) will be grammatical and will mean 'Every red individual is attractive':

(37) *Every red is attractive.

Again, this is not the case. (I am passing over the possibility of interpreting *red* as 'shade of red'.)

A related strategy is to suppose that adjectives in predicative position combine with a phonologically null morpheme that is context-sensitive and thus able to have the value of any contextually salient property of the same type as a noun-meaning (Cresswell 1973, 185; Siegel 1979, 230). The morpheme in question would thus be very like English anaphoric *one*. But this seems to face overgeneration problems too, and with the same examples that we just examined. In order to make sure that a suitable value for the null morpheme is available, let us prefix the examples with a phrase to introduce such a thing:

(38) *Talking of presidents, Joe is a former.

(39) *Talking of birds, every red is attractive.

These examples are clearly ungrammatical even with this assistance. Compare versions with overt *one* after the adjectives, which are perfectly fine in the case of (41) and only slightly awkward in the case of (40):

(40) ?Talking of presidents, Joe is a former one.

(41) Talking of birds, every red one is attractive.

So, for now at least, it is probably better to stick with the account of adjectives in predicative position offered in the first part of this section.

Meanwhile, the current theory can explain the ungrammaticality of (36) by pointing out that it has *a* combined with *former* and the types simply do not work out: *former* is of type ⟨eit,eit⟩ and *a* is either ⟨eit,⟨eit,it⟩⟩ (in its quantificational sense) or ⟨eit,⟨eit,eit⟩⟩ (in (32)). It can explain the ungrammaticality of (37) similarly: *every*, of type ⟨eit,⟨eit,it⟩⟩, would have to combine with *red*, of type ⟨eit,eit⟩, which is impossible.

A related example is (42):

(42) *The president is former.

It is not clear that it is possible to explain the ungrammaticality of this example in semantic terms. The types work out. The possibility of a semantic explanation will depend on the exact meaning of *former*, something that I will not attempt to provide in the current article, although I will give a preliminary analysis in Sect. 3.4. For now, we can just assume that, unlike the majority of adjectives, *former* and other adjectives that never stand alone in predicative position (such as *mere*) bear a *compulsory* E_R feature. That would immediately account for (42) and similar examples (and also (36), of course, which would thus be bad for two reasons).

3.3 Subsective adjectives

Partee (1995) introduced a terminology for classifying adjective meanings that has become influential. An *intersective* adjective *A* combines with a noun *N* to make a phrase that applies to all and only the members of the intersection of the set of things to which *A* applies and the set of things to which *N* applies. For example, *carnivorous mammal* applies to exactly the members of the intersection of the set of carnivorous things and the set of mammals. A *subsective* adjective combines with a noun *N* to make a phrase that applies to a subset of the set of things to which *N* applies. All intersective adjectives are subsective but some adjectives are subsective but not intersective. Take *skilful*, for example, and consider the phrase *skilful orator* in its most natural reading, as picking out the people who are skilful at oratory. We cannot arrive at the set of skilful orators by taking the set of skilful entities and the set of orators and finding their intersection: there would presumably be all sorts of entities in the set of skilful entities that were there not because they were skilful orators but because they were skilful at something else; but some of them would be orators, albeit non-skilful ones. These people would be incorrectly included in the extension of *skilful orator* if *skilful* was intersective. But nevertheless, *skilful* does take us to a subset of the orators, namely the skilful ones.

A question arises concerning adjectives that are subsective but not intersective (which I will henceforth call *merely subsective adjectives*). How exactly do they combine semantically with nouns?

It might be thought that the ⟨et,et⟩ theory has an advantage here. The originators of the ⟨et,et⟩ theory and other people who wrote on it in the early 1970s (such as Wheeler (1972)) are cagey about saying this in so many words. But the thought (made explicit by Beesley (1982, 196–198)) goes something like this: the ⟨e,t⟩ theory says that an adjective and a noun both contribute functions of type ⟨e,t⟩ or sets of individuals; in order to combine those two items to produce the value of an adjective–noun combination, a rule like Predicate Modification is presumably necessary; but this would impose the intersective semantics that we have just seen is inappropriate for merely subsective adjectives. Therefore, the ⟨et,et⟩ theory has an advantage here: since adjective meanings take the semantic values of nouns as arguments, they can manipulate them how they like, as it were; instructions written into the meaning of *skilful* will ensure that for *skilful orator* we obtain the set of people who are skilled at oratory as opposed to the set of orators who are skilled at something or other.[15]

Unfortunately, it seems that the ⟨et,et⟩ theory cannot really claim an advantage here. The relevant observation goes back to Beesley (1982). It seems that merely subsective adjectives do not simply (or at least do not always) take a nominal argument and return a subset of its semantic value, as the above account maintains. Sometimes they seem to work quite differently. Let us first establish that *short* is a merely subsective adjective: we cannot arrive at the semantic value of *short man* by taking the set of men and the set of short things and intersecting them. It is not even clear how we would go about drawing up the set of short things, but the risk is that

[15] It might be possible to see Montague (1970a, 212–213) as arguing something like this, but the thought is very compressed, if so.

it will contain some entities, such as short basketball players, that qualify as short by some criterion, and which are men, but which are not short men. They would then improperly be included in the set that constitutes the extension of *short man* if *short* were intersective. Now we are ready to examine Beesley's (1982, 202) example:

(43) Q: Which of the men over there is Quang?
A: Quang is the short Vietnamese.

As Beesley says, this has a very natural reading according to which Quang is said to be short *for a man*, not short for a Vietnamese person. So the theory of merely subsective adjectives outlined in the preceding paragraph is at best incomplete and might possibly be on the wrong lines altogether.

The standard move at this point (Beesley 1982; Heim and Kratzer 1998; Morzycki 2015) is to say that merely subsective adjectives are context-sensitive and that the crucial set of which they deliver a subset is supplied by the context. In a simple, extensional version of the ⟨e,t⟩ theory, of which Beesley (1982) is an advocate, *short* might, for example, denote a function that takes an individual x and maps x to True if and only if x is short by the standards of the members of S, where S is a contextually salient set supplied via a variable assignment or another means. Of course, nothing prevents S being the extension of the noun of which the adjective is a sister, as it might be, for example, in the case of *short man* or *skilful orator*. In (43), however, things would work differently: presumably with the aid of the occurrence of the word *men* in the introductory sentence, S would be the set of men; the semantic value of *short*, combined with this, would be the characteristic function of the set of individuals who are short by the standards of men; this is then intersected with the set of Vietnamese people and an appropriate meaning is obtained.

I would point out, however, that the move to context sensitivity can be made perfectly well by the ⟨et,et⟩ theory too. In a simple, extensional version, the meaning of *short* might be a function that takes a function f of type ⟨e,t⟩ and maps it to a function that takes an individual x and maps it to True if and only if $f(x) = 1$ and x is short by the standards of S, where S is, once more, a contextually salient set supplied by a variable assignment. Further precision would not be worth our while at this stage: the exact workings of this class of adjectives are very much a topic of ongoing research, but there is no reason to think that research on this topic conducted under the auspices of the ⟨e,t⟩ theory could not be translated into the ⟨et,et⟩ theory.

3.4 Non-subsective adjectives

A non-subsective adjective, in Partee's (1995) classification, is one that, when combined with a noun N, does not necessarily produce a constituent whose denotation in set-theoretic terms is a subset of the denotation of N. Examples include *alleged, former, fake, purported,* and *ostensible*. An alleged murderer is not necessarily a murderer; a former teacher at time t is not a teacher at time t; and so on. It is almost universally acknowledged that non-subsective adjectives must be functions from noun meanings to noun meanings.[16] The meaning of *alleged murderer*, for example, must

[16] I know of only two attempts to argue that this kind of adjective has a semantic type other than a function from noun meanings to noun meanings. Reinert (2024), building on work by Zimmermann (2022), argues

at all costs avoid any commitment to the effect that anyone of whom this is predicated is a murderer, and so intersective or merely subsective meanings for *alleged* are inappropriate: the meaning of *murderer* must be taken and manipulated by the meaning of *alleged*.

While this is encouraging for the ⟨et,et⟩ theory, in that it demonstrates the existence of adjective meanings of the kind that it posits, it is not necessarily an objection to the ⟨e,t⟩ theory that it must acknowledge that some adjective meanings are not of type ⟨e,t⟩ (or an intensionalized variant), since advocates of the ⟨e,t⟩ theory typically do not 'place any premium *per se* on having a uniform semantic type for all members of a given syntactic category' (Heim and Kratzer 1998, 70).

Most non-intersective adjectives seem to require reference (in a loose sense) to non-actual worlds and so cannot be analysed with the simple intensional system laid out in Sect. 2. But here, as a foundation for further research, is a first approximation to the meaning of *former* in that system:

(44) $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.\exists t'(<(t')(t)\ \&\ f(x)(t')\ \&\ \neg f(x)(t))$

A straightforward derivation and calculation establish that (45) has the truth conditions in (46) according to the current system:

(45) John was a former judge.

(46) $\lambda t.\exists t'(<(t')(t)\ \&\ \exists t''(<(t'')(t')\ \&\ \text{judge}(j)(t'')\ \&\ \neg\text{judge}(j)(t')))$

This seems intuitively adequate. Following Wheeler (1972, 318), I take it that both the positive ('judge$(j)(t'')$') and negative ('$\neg$judge$(j)(t')$') conditions are asserted (as opposed to, for example, presupposed).

3.5 Relational adjectives

As well as examples involving *cute*, *skilful*, and *alleged*, we will also have to deal with examples of *relational* or *transitive* adjectives (Mitchell 1986; Partee 1989):

(47) John visited a local bar.

(48) Every sports fan in the country was at a local bar watching the playoffs.

(49) I need to find a plumber local to Westchester.

In (47), *local* seems to mean 'local to John'; (48) seems to mean 'Every sports fan x was at a bar local to x...'. In (49), unlike in the first two examples, the apparent internal argument of *local* seems to be expressed overtly.

The study of relational adjectives is not very far advanced in any theoretical framework, as far as I can see. The comments in this section will therefore be even more tentative and programmatic than usual.

that *alleged* and *former* have the semantics of sentence adverbials, which is to say functions from propositions to propositions. However, she still has these adjectives be sisters of the nouns that it looks like they modify and has to employ a series of construction-specific composition rules in order to get the semantics to work out. I wish to avoid construction-specific composition rules, since they add significantly to the power of a system at a serious cost to theoretical economy.

A very natural hypothesis is to say that *local* and similar adjectives are of type ⟨e,⟨eit,eit⟩⟩. It would be a fairly simple matter to write a lexical entry for *local* of this type that would deal with (47) and (48); one could postulate the existence of a phonologically null variable like *pro* that would be taken as argument by this lexical item and would be bound in (48) and bound or referential in (47).

It is possible that this is the correct way forward. But I have reservations. For one thing, it leaves it unclear why we need the word *to* in (49). It might be tempting to say that *to* is a meaningless element inserted automatically in order to fulfil some purely syntactic requirement, such as giving Case to the apparent internal argument (*Westchester*, in this example). (Note, however, that the grammar specified in Sect. 2 does not include abstract Case.) But that would be to overlook the fact that, although *to* is common in this role, different relational adjectives use different prepositions in this context, and in a way that sometimes suggests that these elements are semantically contentful:

(50) local to, close to, similar to, equal to, identical to, connected to, far from, remote from, different from, divergent from, same as, left of, right of, appropriate for, late for, ready for

Note, among other things, that most adjectives whose meaning has to do with literal or metaphorical closeness have to use *to*, whereas adjectives connected to literal or metaphorical remoteness use *from*. We would be moving too fast, then, if we were to dismiss the word *to* in (49), and the other prepositions in these locations, as meaningless.

My second reservation is theory-internal. If we take the route that I just described, we will no longer be able to have a neat reduction, in the context of Meaning-Dependent Grammar, of adjectives to items of type ⟨eit,eit⟩. Some of them would be items of type ⟨e,⟨eit,eit⟩⟩. Now this in itself would not be disastrous. If we had to give a slightly complex type-theoretic characterization of a certain category for some purposes (perhaps even a disjunctive definition), that would still be better in terms of economy than reintroducing the whole apparatus of autonomous syntactic categories. But it is possible that problems would arise when we tried to add prepositions to our grammar.

The fragment in Sect. 2 does not contain any prepositions. But there is an obvious way to add them in a way that would accommodate a wide range of their uses. In the uses I am thinking of, prepositional phrases are very like adjectives:

(51) a. Kaline is grey.
b. Kaline is in Texas.

(52) a. Every grey cat
b. Every cat in Texas

Looking at these data, the obvious approach is to say that prepositions are of type ⟨e,⟨eit,eit⟩⟩: they first take an internal argument of type ⟨eit,it⟩, which will raise and leave a trace of type e; with the trace in place, the whole prepositional phrase is of type ⟨eit,eit⟩, the type of adjectives, which explains their parallel distribution (with the exception of word order with respect to the noun in the attributive case). The meaning of *in*, for example, might be the following (based on Heim and Kratzer 1998, 66):

(53) $\lambda x.\lambda f_{\langle e,it\rangle}.\lambda y.\lambda t.\, f(y)(t)\ \&\ \mathrm{in}(y)(x)(t)$

Looking at (52b) in particular, we might conjecture that prepositions come with E_R and E_L features, in that order, so as to put their internal arguments and the nouns they modify in the right places.[17] If we took this line, we would also have to deal with prepositional phrases in predicative position, as in (51b). The options available at this point would precisely mirror those for adjectives in predicative position.

All this is very tempting, then, although it is not part of the official fragment of this article, which is the one in Sect. 2. But if we took this line and also adopted the analysis of relational adjectives outlined above, we would not be able to distinguish prepositions from relational adjectives, because they would have the same type.

What to do? It is evident that one of these two analyses will have to go. The fact that relational adjectives cannot take overt internal arguments (or what might be analysed as internal arguments) without help from possibly contentful prepositions is an indication that the two constructions do not work the same way, after all, and, I think, a sign that the ⟨e,⟨eit,eit⟩⟩ analysis of relational adjectives is the one we should renounce.

A possible way forward is to say that the context-sensitivity displayed by examples like (47) and (48) should be dealt with by making the adjectives themselves (as opposed to anything they might combine with) context-sensitive (Partee 1989; Cresswell 1994, 1996). Here, I will deal with the context-sensitivity by means of indices and variable assignments.[18] As a possible foundation for future research, and to demonstrate that the current theory can say something concrete and detailed on this question, I will spell out a version of this option in some detail. The lexical entry of *local*$_i$ will be as follows, assuming interpretation with respect to a variable assignment σ:

(54) $/\mathrm{local}_i/ :: \lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.\ f(x)(t)\ \&\ \mathrm{local}(x)(\sigma(i))(t) :: E_R$

There is a question about the exact nature of indices, but traditionally, both in logic and in linguistics, they have been seen as aspects of the *form* of the items on which they appear: the variables x_1 and x_2 in logic and the traces t_1 and t_2 in linguistics have been seen as different syntactic items differentiated by their form. This implies that the features between phonological slashes on the left-hand side of lexical entries in the current theory should not be seen as just phonological features, but should be conceived of in wider terms; but I will not explore this question in detail now.

In order to show this new lexical entry in action, I will analyse (55), a simplified version of (48):

(55) Everyone entered a local bar.

I will ignore the issue of quantifier domain restriction attendant on *everyone*. In addition to (54), we will need the following lexical entries:

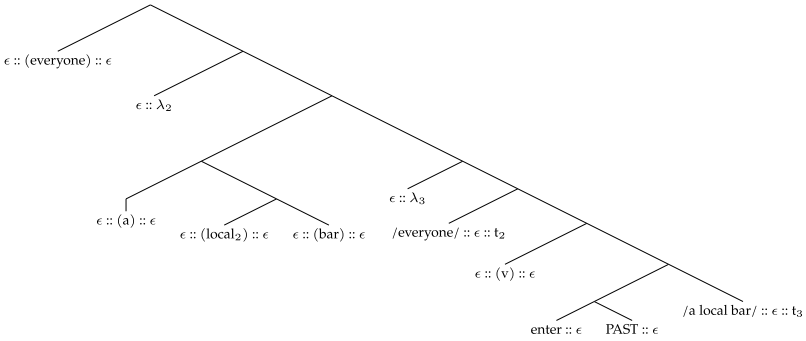
[17] I follow Montague (1970a, 198) and Heim and Kratzer (1998, 65) in supposing that a prepositional phrase that follows a noun, as in (52b), can be treated as such and not as the only visible manifestation of a reduced relative clause, contrary to what was claimed by Ross (1972, 65).

[18] This will entail changing the Traces rule of Sect. 2.2 to something broader that will interpret indices wherever they are found; but this will be straightforward.

(56) a. /everyone/ :: $\lambda f_{\langle e,it\rangle}.\lambda t.\forall x(\text{person}(x)(t) \rightarrow f(x)(t)) :: \epsilon$
b. /a/ :: $\lambda f_{\langle e,it\rangle}.\lambda g_{\langle e,it\rangle}.\lambda t.\exists x(f(x)(t)\ \&\ g(x)(t)) :: E_R$
c. /bar/ :: $\lambda x.\lambda t.\text{bar}(x)(t) :: \epsilon$
d. /enter/ :: $\lambda R_{\langle i,it\rangle}.\lambda x.\lambda e.\lambda t.\text{entering}(e)\ \&\ \text{Theme}(e)(x)\ \&\ R(\text{CUL}(e))(t) :: E_R\ E_R$
e. PAST :: $< :: \epsilon$
f. $\epsilon :: \lambda F_{\langle s,it\rangle}.\lambda x.\lambda t.\exists e(F(e)(t)\ \&\ \text{Agent}(e)(x)) :: E_R\ E_{L,\langle eit,it\rangle}\ i_{\langle eit,it\rangle}\ i_{\langle eit,it\rangle}$

Armed with these lexical entries, we can construct the following tree, which is almost identical to (22); the derivation will be closely analogous to the one in Sect. 2.3.[19]

(57)



A straightforward calculation in the current system reveals that this sentence so analysed has the following truth conditions:

(58) $\lambda t.\forall x(\text{person}(x)(t) \rightarrow \exists y(\text{bar}(y)(t)\ \&\ \text{local}(y)(x)(t)\ \&\ \exists e(\text{entering}(e)\ \&\ \text{Theme}(e)(y)\ \&\ <(\text{CUL}(e))(t)\ \&\ \text{Agent}(e)(x))))$

These are intuitively adequate. Meanwhile, (47) (*John visited a local bar*), if it involves a referential reading of the variable associated with *local*, can be dealt with by having the index on $local_2$ be referential. Examples like (49) (*... local to Westchester*), with an overt locus for the locality introduced by a prepositional phrase, might very well involve semantically contentful prepositions, as the considerations surrounding the list in (50) suggested. There is little or no previous work on the exact status of these prepositions.

I tentatively adopt the partial analysis I have just given for *local*. This is only one word, of course. My impression is that other relational adjectives will have their own complications and surprises.[20] But I hope to have shown that relational adjectives do

[19] The last movement in the derivation, of the semantic features of *everyone* to the root, looks like it might create a Weak Crossover configuration: the movement creates the binder index λ_2 and crosses over the bound index 2 on $local_2$. Should this render the sentence bad in the relevant reading? This is a matter of some controversy: Partee (1989) and Stanley (2000) have alleged that Weak Crossover effects arise with implicit content, like the bound variable somehow associated with *local*, but Rothschild and Segal (2009) have disputed this claim, convincingly to my mind. If necessary, the grammar could be expanded so as to allow movement options that would obviate the Weak Crossover, such as tucking in (Richards 2001).

[20] Beck (2000), for example, argues that English *different* has two separate meanings, based on comparison with German, which uses different words for the two.

not necessarily force us to abandon the project of analysing adjectives as items of type ⟨eit,eit⟩. This is likely to help with the analysis of prepositions in the current framework.

4 Replies to criticisms

In this section, I will reply to various criticisms that have been made of the ⟨et,et⟩ theory over the years. I proceed in roughly chronological order.[21,22]

Before I start reviewing individual arguments, however, it will be well to lay out a particular form that many of them take and to point out a quite general flaw with arguments of this form. Many of the upcoming arguments attempt to establish that adjectives of one kind behave differently from adjectives of another kind according to some diagnostic, where the kinds of adjectives in question might be based on any classificatory divisions that do not directly reference semantic type (intersective versus non-intersective, for example). It is then affirmed or assumed that the differences brought to light by the diagnostic are to be accounted for by saying that the different kinds of adjectives in question have different semantic types (either using that term or something that entails it)—generally ⟨e,t⟩ and ⟨et,et⟩ (or intensionalized variants). If true, this would obviously be detrimental to my project. But this form of argument, in the absence of more detailed discussion (which is typically not forthcoming), obviously neglects to take account of a crucial possibility, namely that the differences between the kinds of adjectives involved are to be accounted for not by means of semantic type but by other differences between those kinds, possibly (but not necessarily) the very differences that have led them to be classified in this way in the first place (for example, the difference between intersective and non-intersective adjectives).

In the previous section, of course, I describe ways of dealing with three prominent kinds of adjectives: intersective, merely subsective, and non-subsective. I do this all within the confines of the ⟨et,et⟩ theory, simply by making the denotations of the

[21] Some may be surprised at the omission of a section on Kamp's influential (1975) article. But the only direct criticism of the ⟨et,et⟩ theory that I can find in this article (as opposed to arguments that the ⟨e,t⟩ theory is viable) is an allegation that the ⟨et,et⟩ theory cannot handle comparatives and superlatives, and that goes by very quickly indeed. Kamp (1975, 127–128) merely gives one possible theory of comparatives based on the ⟨et,et⟩ theory and criticizes it (successfully, I think). That is all. There is not even an attempt at a demonstration that no other theory of comparatives could be erected on the basis of the ⟨et,et⟩ theory.

[22] In addition to the criticisms dealt with in the main text, an anonymous reviewer reminds me of cases like *An occasional sailor strolled by* (Bolinger 1967), which seems to mean something like 'Occasionally, a sailor strolled by'. Some theorists have taken these examples to show that the adjectives in them cannot be of type ⟨et,et⟩ (or type ⟨e,t⟩) and have analysed them in different ways, with the claim that they are determiners being most popular (Stump 1981; Larson 1998; Zimmermann 2003; Morzycki 2016). But others maintain that these adjectives are of type ⟨et,et⟩ (Schäfer 2007; Gehrke and McNally 2011, 2015; Bücking 2014). This latter hypothesis would obviously be congenial to the present project. It faces some problems, but then so does the approach that analyses these adjectives as determiners; see Gehrke 2021 for a judicious assessment of the strengths and weaknesses of the two theories. Since some impressive groundwork has already been done to bring these cases within the scope of the ⟨et,et⟩ theory, I will not discuss them any further in this article.

adjectives do different things within that type (or within the type ⟨eit, eit⟩, strictly speaking). Here, for example, are the meanings that I have proposed for an intersective adjective (*cute*) and a non-subsective adjective (*former*):

(59) $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)\ \&\ \mathrm{cute}(x)(t)$

(60) $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.\exists t'(<(t')(t)\ \&\ f(x)(t')\ \&\ \neg f(x)(t))$

It is obvious that the logical forms of these meanings are substantially different. There would be differences of similar magnitude between the logical form of *cute* and the logical forms of other non-subsective adjectives. These differences could in principle bring about other syntactic, morphological, or semantic differences between these classes of words. The same can be said about differences between merely subsective adjectives and the others. So, there is plenty of scope for differences in meaning bringing about different behaviour according to various diagnostics, even within the confines of the ⟨et,et⟩ theory.

I will call the assumption that differences between adjective classes are due to type *the types-to-blame assumption*. As we will see, it is frequently made with little or no justification, in the manner just laid out.

4.1 Non-restrictive modification of names

Siegel (1976a) develops a theory according to which intersective adjectives are of type ⟨e,t⟩ (or an intensional variant) and non-intersective adjectives are of type ⟨et,et⟩. She says (1976a, 51–52) that this means that only intersective adjectives will be capable of combining with full noun phrases (what many people today call DPs), since non-intersective adjectives require a noun to combine with. The idea seems to be that DPs like names, at least, are of type e and can thus be taken as arguments by functions of type ⟨e,t⟩ but not by functions of type ⟨et,et⟩. And she maintains that the differing behaviour of intersective and non-intersective adjectives bears out this prediction:

(61) They've always wanted to meet healthy/angry/naughty/aged Carla.

(62) *Don't pay any attention to mere/ostensible/actual Jonathan.

But this argument cannot stand. If the combination of intersective adjectives with names (for no other full noun phrases are used) were as simple as Siegel makes it sound, these adjectives, under Siegel's assumptions about type, would presumably take the names or their traces and map them to something of type t. But then the sentences in (61) would crash, because we do not want something of type t in that position. No explicit account is given of exactly how these intersective adjectives combine with names and exactly why the observed differences are due to semantic type as opposed to anything else.[23] In other words, this argument illegitimately makes the types-to-blame assumption.

[23] As far as I can see, no relevant detail is added in Siegel (1979, 237–239) or Beesley (1982, 207), where the argument is reprised.

4.2 Russian long- and short-form adjectives

Morzycki (2015, 27) calls the ⟨et,et⟩ theory the *Adjective Type Homogeneity Hypothesis* and the ⟨e,t⟩ theory the *Adjective Type Heterogeneity Hypothesis*. Building closely on classic work by Siegel (1976a,b), he argues that the ⟨e,t⟩ theory is supported by the behaviour of long-form and short-form adjectives in Russian.[24] These two forms of Russian adjectives are so-named because the long forms have longer suffixes than the short forms. Here are some examples from Morzycki (2015, 30):

(63)

	'good' (fem.)	'talented' (fem.)	'intelligent' (masc.)
long:	xorošaja	talantlivaja	umnyj
short:	xoroša	talantliva	umen

In predicative position, both short and long forms are possible:

(64) Zimnie noči budut dolgimi / dolgi
winter nights will.be long-LONG / long-SHORT
'The winter nights will be long.'

But in attributive position only the long forms are possible:

(65) a. xorošaja teorija
good-LONG theory
'good theory'
b. *xoroša teorija
good-SHORT theory
'good theory'

Morzycki (2015, 31) comments as follows:

> Clearly, there is a language with a systematic contrast in adjectives that is related to the predicative–attributive distinction, a distinction that is in turn related to the choice between property and predicate-modifier denotations. If we were to assume Adjective Type Heterogeneity, we would have an independently motivated tool relevant to accounting for the difference. If, on the other hand, we assumed Adjective Type Homogeneity, it would be necessary to find some other theoretical mechanism to account for these facts.

In more detail, Morzycki (2015, 31) proposes that short-form adjectives are of type ⟨e,t⟩, while long-form adjectives are of type ⟨et,et⟩. The copula will combine with items of type ⟨e,t⟩, which explains how we can have short forms in predicative position. The type of the long forms makes them ideal for attributive position. We can have long forms in predicative position, according to Morzycki, by means of an expedient like that proposed by Montague (1970a), discussed in Sect. 3.2 above. But why can we not have short forms in attributive position interpreted by a rule of Predicate Modification? Morzycki (2015, 31,33–34), following Siegel (1976a), suggests

[24] I cite Morzycki as making this argument, rather than Siegel directly, because Siegel in her classic work does not seem to me to argue directly against the viability of the ⟨et,et⟩ theory so much as show that an analysis of the data in terms of the ⟨e,t⟩ theory is possible and natural. Morzycki (2015, 30) says that she demonstrates the superiority of the ⟨e,t⟩ theory, however, so perhaps I am being too cautious in my reading.

that in fact there is no such rule and that adjectives cross-linguistically behave like the Russian ones, even in languages (the vast majority, I assume) that do not make a morphological distinction along the lines of the one in Russian.

This would involve a vast amount of ambiguity in the adjectives of the world's languages, of course. It is also notable that this account is rather uneconomical even as an account of Russian adjectives: it posits not only two different semantic types for these adjectives but also a device of the kind suggested by Montague (1970a) to help the ⟨et,et⟩ theory (that is to say, a theory that posits only *one* type for adjectives).

Furthermore, we should note that this account is not, strictly speaking, a defence of the ⟨e,t⟩ theory (or Morzycki's Adjective Type Heterogeneity Hypothesis, which is stated equivalently, despite the fact that its name suggests something broader). For the ⟨e,t⟩ theory states that adjectives are quite generally of type ⟨e,t⟩ (or an intensionalized variant), with the exception of a few non-subsective adjectives like *alleged* and *former*. It does not state that adjectives in general are systematically ambiguous, as Siegel (1976a,b) and Morzycki (2015) do.

And finally we should note that Morzycki's argument does not actually amount to a demonstration that the ⟨et,et⟩ theory cannot cope with the relevant facts. A full account of the Russian facts in the terms of the ⟨et,et⟩ theory is beyond the scope of this article, since the data are very complicated (much more so than has been shown here—see the literature cited in footnote 25.). But the following sketch will hopefully suffice for showing that the data to which Morzycki draws attention do not present any particular problems. The theory of the current article will say that both short and long forms are of type ⟨eit,eit⟩; and the copula, which is sometimes null in Russian, is of the type posited above for the English copula (⟨⟨eit,eit⟩,eit⟩ when combined with tense). Short-form adjectives have no E_R or E_L features, meaning that they cannot take nouns as arguments; but they can be taken as arguments by the copula. (There is no Predicate Modification, of course.) Long-form adjectives have optional E_R or E_L features, meaning that they can take nouns as arguments using those and (without them) be taken as arguments by the copula. This is all that would be needed in order to account for the above data in the current theory.[25]

4.3 Beesley's syntactic analogy arguments

Beesley (1982, 205–208) musters a series of arguments designed to show that 'degree adjectives' (that is, merely subsective adjectives that seem to require comparison classes) behave more like 'absolute adjectives' (perhaps intersective adjectives—they are defined ostensively on page 196 of the article as being adjectives like *red*, *carnivorous*, *metallic*, and *pregnant*) than like 'relative adjectives' (that is, non-subsective adjectives). The idea is that, since absolute adjectives should be conceived of as being of type ⟨e,t⟩, degree adjectives should be too (Beesley 1982, 205), while relative

[25] Siegel (1976a,b) and Babby (2010) have argued that long-form adjectives in predicative position modify phonologically null nouns, possibly variables over noun meanings. If this turns out to be correct for Russian, the combination of these long-form adjectives with phonologically null nouns in predicative position will presumably be of type ⟨e,it⟩; this could be restored to the expected ⟨eit,eit⟩ by a phonologically null version of the morpheme in (32) or an equivalent type-shifting procedure. But the solution in the text is more straightforward.

adjectives are of type ⟨et,et⟩. These arguments, then, rest on a premise that I do not accept, namely that absolute adjectives are of type ⟨e,t⟩. But I will discuss some of them here, since it is sometimes possible to extract from them considerations that transcend this starting assumption. In particular, the arguments seem designed to show that absolute and degree adjectives, on the one hand, and relative adjectives, on the other, are of different semantic types, which would obviously be detrimental to my project.

In his first argument, Beesley (1982, 205) draws attention to the following paradigm dicussed by Siegel (1979, 228):

(66) Mary is pregnant. (absolute)

(67) Mary is tall. (degree)

(68) *Mary is mere/alleged/ostensible. (relative)

Beesley says that if *tall* were of type ⟨et,et⟩, it would have to have a phonologically null noun as its sister, contributing a suitable noun meaning (giving us 'tall woman' or 'tall entity' or something of the sort). But then it would be mysterious why such a thing could not make the sentences in (68) good ('alleged woman', 'alleged entity', or similar). We would have to make an ad hoc stipulation based on adjective class, to the effect that these null nouns were not allowed with relative adjectives.

But this argument, as can be seen, starts from a faulty premise, namely that sentences like (67) require phonologically null nouns as sisters of the adjectives if the adjectives are of type ⟨et,et⟩. If we avoid this move and instead give a suitable denotation to the copula, as I argued in Sect. 3.2, we obviate the force of the argument.

The second argument (Beesley 1982, 205–206) makes use of the proform *one*. Beesley alleges that only some adjectives allow their nominal sisters to be *one*, and that degree adjectives behave like absolute adjectives:

(69) This is a red box and that is a blue one. (absolute)

(70) This is a big box and that is a small one. (degree)

(71) *This is an alleged thief and that is a mere one. (relative)

(72) *This is an alleged thief and that is an ostensible one. (relative)

The exact way in which these data have implications for the type of adjectives is not spelled out. We can see, then, that the argument illegitimately makes the types-to-blame assumption.

It is also notable that the picture of the data painted by Beesley is dubious. Relative (that is, non-subsective) adjectives can in fact appear with proform *one* as their sisters. The first example showing this is a quotation from Peters (1960, 32):

(73) Motives, of course, may be mixed; but this only means that a man aims at a variety of goals by means of the same course of action. Similarly a man may have a strong motive or a weak one, an ulterior motive or an ostensible one.

It appears that the sister of *ostensible* can be *one*, then. Likewise with the classic non-subsective adjective *alleged*:

(74) This man is definitely a thief. That man is just an alleged one.

Out of the non-subsective adjectives that Beesley cites here, the only one that is not obviously able to combine with *one* is *mere*; but we can hardly draw far-reaching conclusions about adjectives as a whole on the basis of this one example.[26]

The third argument (Beesley 1982, 206–207) makes use of the adjective modifier *very*. The central idea is that we can learn something about the types of the different classes of adjectives under discussion by means of the following paradigm:

(75) The very red woman finally left the beach.

(76) The very tall woman got the job.

(77) *They sent me a very mere boy.

(78) *The very alleged thief was freed.

The idea, once again, is that degree adjectives (*tall*) behave like absolute adjectives (*red*) and not like relative ones. We can reply that, since no detailed account is given of exactly why the adjectives divide as they do, the argument illegitimately makes the types-to-blame assumption.

This is sufficient to show that the argument is not sound. But we can speculate that (78) might be bad not because *alleged* is of type ⟨et,et⟩ (or an intensional variant) but because it is not a degree adjective: being alleged might be something that we do not conceive of as coming in degrees; it is might be an all-or-nothing deal. This would make *very* introduce an inappropriate presupposition or assertion, then, given that it indicates that some relevant property obtains to a high degree. This would account for the deviancy. Again, it is not clear how much we can learn about adjectives just from the case of *mere*.

The sixth argument[27] is another attempt to show that adjectives come with two different types. Beesley (1982, 208) claims that 'only those adjectives that are one-place predicates have meaningful nominalisations or corresponding nominal forms.' He gives the following data:

(79)

Adjective	*Noun*
red	redness
tall	tallness, height
big	bigness, size
intelligent	intelligence
mere	*mereness, *merity
alleged	*allegedness
ostensible	*ostensibility

Beesley's explanation of these facts is interesting. He says (1982, 208), 'The general intuition is this: being red or tall involves partaking of the qualities of redness or height respectively. But there is no way to make sense of a property of **mereness* or **allegedness* in the same way.'

[26] An anonymous reviewer points out that temporal non-subsective adjectives can also be used with the proform *one*: *This is the current president and this is a former one.*

[27] The fourth argument is taken from Siegel (1976a, 51–52) and is discussed separately in Sect. 4.1. And the fifth one, also from Siegel (1976a), is said to be seriously flawed by Beesley himself.

I think that this explanation of these facts is probably on the right lines, but that it does not have any implications for semantic type. Given the model of (59) (repeated as (80)), it is likely that the meanings of intersective and merely subsective adjectives contain easily extractable references to qualities such as those of redness and height; these could be extracted and manipulated by the suffix *-ness* in the formation of words like *redness* and *tallness*.

(80) $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.f(x)(t)$ & cute$(x)(t)$

(81) $\lambda f_{\langle e,it\rangle}.\lambda x.\lambda t.\exists t'(<(t')(t)$ & $f(x)(t')$ & $\neg f(x)(t))$

Given the model of (60) (repeated as (81)), however, it is likely that the meanings of non-subsective adjectives will work quite differently. This argument, then, illegitimately makes the types-to-blame assumption.[28,29]

4.4 The arguments of McNally and Boleda

McNally and Boleda (2004) make a series of arguments against analysing so-called relational adjectives in Catalan as being of type ⟨et,et⟩ (or an intensional variant). A relational adjective, in this context, is not one like *local* that arguably takes an internal argument, but one of a class of adjectives like *solar* and *pulmonary* that are arguably related to nouns in syntactic or semantic terms. Given this aim, it can be seen that McNally and Boleda's arguments are not directly problematic for the ⟨et,et⟩ theory. But they often involve an attempted demonstration that adjectives in English or Catalan are of two types: ⟨e,t⟩ and ⟨et,et⟩, or intensional variants. So in that respect they are highly relevant. I will extract from their work what is most relevant to the current article, sometimes neglecting details about relational adjectives in particular.

As part of their first argument (McNally and Boleda 2004, 180) they point out that one way of dealing with the well-known ambiguity of (82) is to say that the 'dances beautifully' reading arises from an ⟨et,et⟩ adjective while the 'Olga is beautiful' reading arises from an ⟨e,t⟩ adjective.

(82) Olga is a beautiful dancer.

This, they say, 'postulates an ambiguity for many adjectives that is difficult to justify'. But according to the ⟨et,et⟩ theory there would at least be no ambiguity of type here.

[28] One might think of objecting to Beesley by pointing out that the word *ostensibility* actually does exist. But it seems to be attested only in the meanings 'ability to be shown or exhibited' and 'conspicuousness, ostentation' (*Oxford English Dictionary*, s.v. 'ostensibility (n.)', July 2023, https://doi.org/10.1093/OED/3535747874). It does not seem to be attested, nor is it possible for me to understand it, as being related to the 'presented (esp. untruthfully or misleadingly) as actual' meaning of *ostensible* (*Oxford English Dictionary*, s.v. 'ostensible (adj.), sense 2', July 2023, https://doi.org/10.1093/OED/1558441959). But it is only this latter meaning of *ostensible* that is non-subsective. Similarly, the word *mereness* is actually attested, but it is arguable that, apart from an archaic meaning 'purity', it means only 'the quality…of being small or insignificant' (*Oxford English Dictionary*, s.v. 'mereness (n.), sense 2', July 2023, https://doi.org/10.1093/OED/9430613748). This, again, would not be a non-subsective meaning.

[29] Beesley (1982, 208) also includes a table of adjectives paired with corresponding verbal forms as part of the present argument. If this were seen as a separate argument, it too would be susceptible to the criticism that it illegitimately makes the types-to-blame assumption.

As for an ambiguity within one type, it is hard to see how any analysis of this sentence could avoid either ambiguity or equivalent complication.[30]

McNally and Boleda's (2004, 180) second argument is as follows:

> the predicate modifier analysis makes it difficult to explain why the putatively nonintersective reading is sometimes available even when the adjective appears to be predicated of something of type e. For example, *beautiful* in [(83)] is most naturally understood as describing Olga's dancing, even though it does not modify any noun, and following the standard semantics of copular constructions, should be predicated directly of Olga.
>
> (83) Look at Olga dance—she's beautiful!
>
> Unless some kind of ellipsis is postulated, the predicate modifier analysis cannot explain why sentences such as [(83)] are grammatical and mean what they do. Yet ellipsis is difficult to justify: there is no direct antecedent for a hypothetically elided noun *dancer*, and we would also have to explain why the indefinite article *a*, which would be necessary to form a grammatical postcopular NP, is also elided.

The most telling scenario, of course, is one in which Olga is ugly in facial terms but dances beautifully. If Olga is imagined to be beautiful in facial terms, the second sentence of (83) might seem true because of that alone. Let us uncharitably assume the first kind of scenario, then. To the extent that the second sentence of (83) is true in such a scenario, it seems to me that we are assuming that there are different ways of being beautiful and that Olga is beautiful because she dances beautifully. The second sentence of (83), then, just means that Olga is beautiful. Support for this analysis comes from the fact that (83) can be used to contradict a tactless person who claims that Olga is ugly:

(84) A: Olga is ugly.
B: No, look at her dance—she's beautiful.

It has not been established, then, that *beautiful* in the sense it has in the 'dances beautifully' meaning of *beautiful dancer* can appear alone in predicative position. So the current argument is unsound.[31]

McNally and Boleda's (2004, 183) third argument concerns stranded or dislocated elements related to the partitive pronoun *en* in Catalan. Roughly, this pronoun can be anaphorically related to a bare NP or can take on the semantics of a prepositional

[30] McNally and Boleda (2004) themselves do not analyse this sentence in their own system. Larson (1998, 152), whom they cite with approval in this connection, manages to use only one meaning for *beautiful* but at the cost of positing two construction-specific rules to effect the combination between *beautiful* and *dancer*.

[31] McNally and Boleda (2004, 180) draw similar conclusions from a similar example sentence: *That fur is fake*. But they do not spell out the argument in any detail. I will just say, then, that I do not see any objection to the ⟨et,et⟩ theory in *That fur is fake*. It could be dealt with by *fake* being of type ⟨et,et⟩ (or an intensionalized variant) and hosting an index to supply, in a context-sensitive way, a property indicating what is being faked (the property of being fur, in this case). Alternatively, it could be dealt with by supposing that there is NP-deletion after *fake*, so that underlyingly we just have *That fur is fake fur*.

phrase headed by *de* 'of' (Rigau and Saldanya 2020, 178). To set things up the way McNally and Boleda do, here is their introductory example of *en* in action:

(85) Buscàvem llibres, però no en vam trobar.
we.looked.for books but not EN we.did find
'We looked for books, but we didn't find any.'

McNally and Boleda (2004, 184) say that *en* is or can be related to a DP and that 'some of the material in the related [D]P can be stranded or dislocated, provided it is preceded by the preposition *de* "of".' Their initial examples are in (86). In the case of (86b), we understand that pictures are the topic of conversation; that meaning is supplied in a way that is not made clear.[32]

(86) a. No en vam trobar, de fotografies maques.
not EN we.did find DE pictures beautiful
'Beautiful pictures, we didn't find any.'
b. No en vam trobar, de maques.
not EN we.did find DE beautiful
'Beautiful pictures, we didn't find any.'

When we try to replicate this construction with a non-subsective adjective, however, we find that the adjective cannot be stranded by itself:

(87) a. No en vam veure, de presumptes assassins.
not EN we.did see DE alleged murderers
'We did not see any, alleged murderers.'
b. *No en vam veure, de presumptes.
not EN we.did see DE alleged
'We did not see any, alleged murderers.'

Why the contrast between (86b) and (87b)? McNally and Boleda (2004, 184) observe that it is impossible to strand a determiner after *de*:

(88) a. En vam trobar una.
EN did find one.
'We found one.'
b. *En vam trobar d' una.
EN did find DE one
'We found one.'

On this basis, they 'posit that the preposition *de* when linked to the pronoun *en* must be followed by a property-type constituent' (2004, 184) (that is, by something of type ⟨e,t⟩ or an intensional variant). So, (87b) is bad because *presumptes* is of type ⟨et,et⟩ or an intensional variant. Thus, it seems that it has been established that adjectives come in at least two types.

[32] I have glossed *de* as 'DE', because, while some theorists (e.g. McNally and Boleda) are content to gloss it 'of', others maintain that in this position it is in fact a determiner (Espinal and Giusti 2024). I have tried to maintain neutrality for current purposes.

McNally and Boleda do not, however, argue in any detail that the difference between intersective and non-subsective adjectives is one of type. They admit, in fact, that they do not give a full analysis of the construction concerned (2004, 184). This manifests itself it two ways. First, they do not argue against or consider any other hypotheses. It is not within the scope of this article to investigate any alternative hypotheses in depth, but it is notable that the data in (86b) and (87b) would be explained if there were no silent nouns after the adjectives concerned (which is implied by McNally and Boleda's assertion that these elements are stranded or dislocated) and if adjectives of these kinds in Catalan had the same distribution of E_L and E_R features that I have argued for in the case of their English counterparts (Sect. 3.2): optional features of this kind for *beautiful* and *maques*, compulsory E_R for *alleged* and *presumptes*. Then *presumptes* in (87b) would have a non-interpretable syntactic feature that it was unable to discharge, but *maques* in (86b) need not have; that would account for the difference in grammaticality between the two. There are doubtless other alternative hypotheses that one could explore.

The second way in which McNally and Boleda's analysis is incomplete is that they do not take account of some closely related data that look as if they will be relevant. Martí (1995, 253–254) points out that in the construction in question there can be other stranded elements that are plausibly of type ⟨e,t⟩ (in conventional terms, not in the terms of the current research programme) but that cannot appear with *de*.[33]

(89) a. *N' he comprat dues d' amb botons.
EN I.have bought two DE with buttons
'I have bought two with buttons.'
b. N' he comprat dues amb botons.
EN I.have bought two amb buttons
'I have bought two with buttons.'

(90) a. *No n' he vist cap de que funcioni amb energia solar.
not EN I.have seen any DE that functions with energy solar
'I haven't seen any that function with solar power.'
b. No n' he vist cap que funcioni amb energia solar.
not EN I.have seen any that functions with energy solar
'I haven't seen any that function with solar power.'

Prepositional phrases and restrictive relative clauses would both be of type ⟨e,t⟩, or an intensionalized variant, in contemporary standard theories (Heim and Kratzer 1998). But they cannot appear after *de* in this construction. Now, these are not counterexamples to McNally and Boleda's claim, in which the implication goes the other way: they say that 'the preposition *de* when linked to the pronoun *en* must be followed by a property-type constituent' (2004, 184). But severe doubt is thrown onto the claim of this generalization to be complete and explanatory when we realize that there are property-type constituents that *cannot* appear after *de* when it is linked to *en*. If *de* can, in fact must, take property-type constituents, why can it not take these? It is hard to avoid the impression that McNally and Boleda's generalization is at best telling us only part of the story and might very well have to be discarded completely when a

[33] I have confirmed these judgements with Eva Bru-Dominguez, to whom I am very grateful.

full account of the relevant data is formulated. I do not think, then, that the data to which they draw our attention amount to a compelling objection to the ⟨et,et⟩ theory.

McNally and Boleda's (2004, 185) fourth argument concerns the possibility of phrases of the form 'determiner adjective' in Catalan. Here are their examples:

(91) a. Els joves van venir.
the young did come
'The young ones came.'
b. *Els presumptes van venir.
the alleged did come
'The alleged ones came.'

McNally and Boleda continue (2004, 185): 'Although, once again, a full analysis of this construction is not possible here, a simple explanation of these facts would be that Catalan, unlike English, regularly allows for determiners to combine with adjectives, as long as the adjective is of the appropriate semantic type. Given that the determiner, under most assumptions, combines only with constituents of type ⟨e,t⟩, we can readily explain' the above contrast. The contrast comes about, in other words, because *joves* is of type ⟨e,t⟩, or an intensionalized variant, whereas *presumptes* is of type ⟨et,et⟩.

Once more, I would require a fuller analysis of the construction to be convinced. There seems to have been little or no work on this construction in Catalan, in particular, but a common approach to similar constructions in other languages is to posit the existence of phonologically null nouns in places where a noun seems to be missing, perhaps with fixed general meanings like 'people' (Pullum 1975; Kester 1996; Giannakidou and Stavrou 1999; Panagiotidis 2002, 2003). These can plausibly be told apart from instances of NP-deletion by a variety of diagnostics, including the possible absence of antecedents (Saab 2018). Spanish has a construction very similar to the above Catalan one that has been analysed in terms of null nouns (Contreras 1989). All this means that it is quite likely that Catalan does in fact possess the resources to give the definite article in (91b) a constituent of type ⟨e,t⟩ to combine with: the adjective *presumptes* combined with a phonologically null noun meaning 'people', the latter playing a role in (91a) too. This means that the degraded status of (91b) is quite plausibly due to pragmatic factors, such as the infelicity of calling someone an alleged person; the details, of course, will depend on what phonologically null nouns Catalan has at its disposal and exactly what they mean. There does not seem to have been much work on this.

More generally, we can see that McNally and Boleda illegitimately make the types-to-blame assumption here. They show that non-subsective adjectives differ from others in a certain respect (assuming that their two-word paradigm generalizes) and then claim that the difference is due to semantic type as opposed to the other differences between the adjectives in question; but they do not argue in any detail that this is the case.

McNally and Boleda's (2004, 186) fifth and last argument concerns the different interpretations available to the following two phrases:

(92) a. jove presumpte assassí
young alleged murderer
'young alleged murderer'
b. presumpte jove assassí
alleged young murderer
'alleged young murderer'

They point out that (as in the English translations) describing someone with (92a) commits the speaker to the person in question being young, whereas this does not hold for (92b); in the latter example the youth could just be part of the allegations that are being reported. They continue as follows (2004, 186): 'As a first approximation, we can attribute this difference to the nonintersectivity of the semantic contribution of *presumpte*. If *presumpte* is not intersective, there will be no guarantee that combining it with a given noun and then combining the result with some other adjective will return the same result as combining it with that noun previously modified by the same adjective.'

But these considerations reveal nothing about the type of *jove*. We knew already that *presumpte* had to take the phrase it combines with as an argument; we knew that it is of type ⟨et,et⟩, or an intensional variant, in other words. But there is nothing to stop *jove* in (92a) from being of type ⟨et,et⟩ and taking as its argument in the semantics the denotation of *presumpte assassí* and returning the set of young alleged murderers, by means of an intersection process that is directed by the semantics of *jove*, as we have seen in the meaning of *cute* in (59). The difference between the meanings of these two phrases is basically a matter of scope, of course: *jove* is in the scope of *presumpte* in (92b) but not in (92a).

4.5 Kennedy's arguments

Kennedy (2012) puts forward three arguments against the ⟨et,et⟩ theory.

The first is based on some adjective ordering effects noted by Bolinger (1967, 4). There is a difference in interpretation between (93) and (94):

(93) The visible stars were Aldebaran and Sirius.

(94) The stars visible were Aldebaran and Sirius.

Example (93) has a reading whereby it talks about inherently visible stars (stars of a sufficiently high magnitude to be seen with the naked eye, for example). It also appears to have a reading, not mentioned by Bolinger (1967) but given by Kennedy (2012, 332), according to which it is just talking about the stars that were visible in the sky at one particular moment (the others perhaps being covered by cloud). Example (94) only has this second reading, however. Bolinger (1967, 4) also alleges a similar contrast between *the only navigable river*, which could be talking about being navigable as an inherent characteristic, and *the only river navigable*, which has to be talking about navigability at a particular moment.

Kennedy (2012, 334) comments as follows, referring to the ⟨et,et⟩ theory as the *uniformity hypothesis*: 'The disadvantage of such an approach is that in effectively building noun-dependency into the meaning of the adjective, the uniformity hypothesis doesn't leave much space for complex structural effects on meaning of the sort we

observed in the previous section for adjectives like *visible*.' There is not enough here, however, to cause a difficulty for the ⟨et,et⟩ theory. In fact, I have difficulty divining Kennedy's train of thought. If the differences in meaning pointed out by Bolinger really have their origin in structure, as Kennedy suggests, then the ⟨et,et⟩ theory, like any other theory, can respond to this by building in appropriate structural differences, at a minimum the difference between pre- and post-nominal position. (This would be done easily in the theory of the current article by judicious use of E_L and E_R features.) And adjectives in the ⟨et,et⟩ theory are not characterized, strictly speaking, by 'noun-dependency' but by dependency on a sister of type ⟨e,t⟩, which is different and allows more flexibility. Kennedy does not give any further details, so I am not sure what else to say.[34]

Kennedy's (2012, 334–335) second argument seems to be to the effect that some phenomena that were previously thought to necessitate denotations of type ⟨et,et⟩, or an intensional variant, can be dealt with in other ways. He introduces it by saying that the ⟨et,et⟩ theory 'can lead to an over-simplistic assessment of the data, when a more sophisticated analysis of both noun and adjective meaning can provide us with ways of explaining patterns like those above without adopting the attributive analysis of adjective meaning' (2012, 334). The actual example he gives involves an analysis of *Olga is a beautiful dancer* by Larson (1998); he summarizes the argument by saying, 'Larson's analysis shows how one kind of subsectivity can be handled by appealing to a more sophisticated theory of noun meaning.' As far as I can see, then, the overall form of the argument is the one that I summarized at the start of this paragraph: some phenomena that were previously analysed as involving ⟨et,et⟩ meanings can be handled differently. But this is not, in itself, an argument against the ⟨et,et⟩ theory. It is at best an argument that another kind of theory is also in the running. Even if it succeeds, I submit that the prospect of abolishing autonomous syntactic categories with the help of the ⟨et,et⟩ theory gives us a strong methodological reason to prefer it.[35]

Kennedy's third and last argument is explicitly another argument of the kind just described. He argues that sentences like (95) do not have to be analysed in terms of the ⟨et,et⟩ theory:

(95) Julian is a tall jockey.

This may be so, but, as before, this is an argument against one argument in favour of the ⟨et,et⟩ theory rather than an actual argument against the ⟨et,et⟩ theory.

[34] I will just add that the hypothesis of lexical ambiguity deserves more of an airing than Kennedy gives it: in the same list of ordering effects from which the above examples are drawn, Bolinger (1967, 4) also claims that two different senses are involved in some cases. He gives the following example: 'Thus *The man is responsible* is ambiguous as between "trustworthy" and "to blame", but *the man responsible* is unambiguously "to blame" and *the responsible man* is almost unambiguously "trustworthy".'

[35] The actual example Kennedy uses, as I say, involves the analysis of sentences like (82) (*Olga is a beautiful dancer*). As I point out in footnote 30, Larson's (1998) analysis of this sentence, while it is undoubtedly sophisticated in some ways, involves positing two separate construction-specific semantic rules in order to effect the necessary composition. I do not think that it merits a privileged status in terms of theoretical economy, then.

4.6 Degree semantics

An anonymous reviewer for this journal raises the issue of degree semantics, which has proven useful for the analysis of comparatives and superlatives and other constructions such as adjectival modifiers (Seuren 1973; Cresswell 1976; von Stechow 1984; Bierwisch 1989; Kennedy and McNally 2005; Kennedy 2007; and many others):

(96) John is six feet tall.

(97) John is very tall.

In this tradition, it is common for adjective denotations to include an argument slot for a degree. Morzycki (2021, 8), for example, gives the following representative treatment. The adjective *tall* will have the denotation in (98); *six feet* in (96) will denote a degree, an entity of type d. This means that *six feet tall* will have the denotation in (99):

(98) $[\![\text{tall}]\!] = \lambda d.\lambda x.\text{tall}(x)(d)$

(99) $[\![\text{six feet tall}]\!] = \lambda x.\text{tall}(x)(\text{6-feet})$

If this approach is on the right lines, then, in the broad framework of the current article, I should presumably renounce my attachment to ⟨eit,eit⟩ as the type of adjectives and instead adopt something like ⟨d,eiteit⟩. Perhaps *tall* would have a denotation like the following:

(100) $[\![\text{tall}]\!] = \lambda d.\lambda f_{\langle \text{e,it}\rangle}.\lambda x.\lambda t.f(x)(t)\ \&\ \text{tall}(x)(t)(d)$

This could presumably be managed. But the reviewer points out that there has only ever been good evidence for degrees in the semantics of *gradable* adjectives, which is to say (roughly) adjectives that form comparatives and superlatives and that can be modified by expressions like those in (96) and (97).[36] Non-gradable adjectives, like *dead, atomic, former*, and *alleged* do not enter felicitously into the kind of constructions that we are talking about:

(101) ??John is very dead.

(102) ??This bomb is quite atomic.

(103) ??Richard Nixon is a more former president than Joe Biden.

There is good reason to think, then, within the framework of the current article, that non-gradable adjectives really are just of type ⟨eit,eit⟩. But that would result in the class of adjectives corresponding to two different semantic types in the current theory,

[36]This is relevant to a point regarding my overall strategy for providing a reductive analysis of the category Adjective based on semantic type. Why I do not adopt a degree-semantics analysis of the kind sketched in (98) and say that adjectives are distinguished by having degree arguments? Unfortunately, there are challenges to both directions of this possible equivalence. For one thing, some theorists have posited that categories other than adjectives involve degrees in their semantics (Kennedy and Levin 2008; Piñón 2008; Morzycki 2009). And, conversely, as the reviewer points out, it is not certain that the semantics of all adjectives involves degrees.

⟨d,eiteit⟩ and ⟨eit,eit⟩, thus foiling my efforts to reduce the category of adjectives to one semantic type.

There are at least two ways to respond to this point. The first is to accept that the two semantic types just mentioned will both play a role in the grammar and say that this does not matter. It is true that the project of Categoriless Minimalist Meaning-Dependent Grammar is easily summarized, as I did in the first paragraph of this article, by saying that DPs can be conceived of as items of type ⟨et,t⟩, VPs can be conceived of as items of type ⟨s,t⟩, and so on; the aim of finding a one-to-one correspondence between syntactic categories and semantic types is a worthy one and things would work out particularly neatly if that vision could be vindicated. But the success of the project does not depend on this. All that really matters at the end of the day is that the right strings be accepted and rejected as sentences and that the accepted strings be given intuitively satisfying meanings. If this condition is fulfilled, it does not matter for the current project if one formerly unitary syntactic category is split into two when it comes to semantic types. The idea would be that the two types in question, in conjunction with the rest of the grammar, conspire, as it were, to bring it about that the two semantic categories have similar or identical distributions.

In order to spell this out in more concrete terms for the current case, we will have to help ourselves to one more standard tool from the tradition of degree semantics. There is a question as to how an adjective with a denotation like (98) combines with nouns, for example, when it is not involved in any fancy goings on like the comparative degree or modification by *six feet*. How do we get *tall boy*, given that *boy* is of type ⟨e,t⟩ and *tall* is of type ⟨d,et⟩? It looks like the types do not work out. The standard manoeuvre at this point is to posit a phonologically null morpheme called *pos* that attaches to gradable adjectives and makes the types work out. The idea goes back to Cresswell 1976 and has been adopted by many theorists since. Here is Morzycki's (2021, 8) version:

(104) $[\![\text{pos}]\!] = \lambda G_{\langle \text{d,et} \rangle}.\lambda x.\exists d(d > \text{standard}(G)\ \&\ G(d)(x))$

The 'standard' operator is a context-sensitive operator that will provide the smallest degree on a scale that is consistent with the predicate in question being satisfied (so the smallest degree that makes someone tall, in this case—as can be imagined, there are complications here, but I will not go into them). The upshot of merging *pos* and *tall* is a constituent of type ⟨e,t⟩ that can be combined with *boy* by Predicate Modification.

For current purposes, it is easy to see that one could make up a version of *pos* that would operate on a gradable adjective of type ⟨d,eiteit⟩ and produce a related constituent of type ⟨eit,eit⟩. ('Proof: Exercise', as they say in certain textbooks.) So, still assuming that we are dealing with the two basic lexical types ⟨d,eiteit⟩ and ⟨eit,eit⟩, it is reasonable to believe that any version of this strategy in the context of the current grammar would posit that, in the absence of fancy goings on (that is, in the case of the unmodified positive degree), we would in fact be dealing only with constituents of type ⟨eit,eit⟩: bare non-gradable adjectives and gradable adjectives combined with *pos*. So the argumentation of this article, which has sought to show that type ⟨eit,eit⟩ is a perfectly reasonable and defensible choice for these cases, would still stand. It is not clear to me that a problem would arise.

The second way to respond to the referee's challenge is to point out that there is in fact a long-standing tradition according to which gradable adjectives do not take degree arguments after all, which would mean that we are not in fact dealing with two distinct semantic types. This is the tradition sometimes called *delineation semantics* (Lewis 1970; Klein 1980; van Benthem 1982; Keenan and Faltz 1985; Larson 1988; Barker 2002; van Rooij 2011; Burnett 2014, 2017). A *delineation* (Lewis 1970, 64) is a boundary between the set of things to which a predicate applies and the set of things to which it does not. (It is thus very similar to the notion of 'standard' employed by degree semantics in the definition of *pos*.) Delineations are most often conceived of as dividing sets of individuals, but they can also be applied to degrees arranged on a scale (Barker 2002). Adherents of this school also display a fondness for extension gaps. But the crucial point is that in this tradition delineations are conceived of as being part of the indices or parameters at which or in relation to which sentences are interpreted; and they are represented and manipulated by superscripted parameters on the interpretation function or by other means. In general, this tradition seeks to accomplish by means of context-sensitivity what many representatives of the degree semantics tradition do by means of degree arguments in denotations. Compare the two approaches to relational adjectives discussed in Sect. 3.5: they could relate to their relata by taking an argument, thus being of type ⟨e,eiteit⟩, or they could do so by means of an index and a variable assignment, thus being of type ⟨eit,eit⟩.

In terms of the two main theories of adjectives being compared in the current article, representatives of delineation semantics have generally worked within the ⟨e,t⟩ theory, but I see no reason why their theories could not be converted into versions of the ⟨et,et⟩ theory.

I will not attempt to produce a detailed version of such a theory here. I would like to note, however, that recent survey assessments of degree semantics and delineation semantics have found them pretty evenly matched, with distinct and roughly commensurable strengths and weaknesses (Sassoon 2013, Chap. 3; Lassiter 2015, 151–152; Morzycki 2016, 121–124). Delineation semantics arguably has a problem with higher-order vagueness, which arises in connection with extension gaps (Morzycki 2016, 121–122); but this is at least matched in seriousness by the problem that degree semantics has with the fact that no known language spells out the *pos* morpheme overtly (Kennedy 2012, 337; Lassiter 2015, 152); delineation semantics arguably has difficulties with subcomparatives (*The table is longer than the bed is wide*—Kennedy 1999; Morzycki 2016, 122); but then again, degree semantics has trouble with the fact that, crosslinguistically, comparatives tend to be morphologically more complicated than the positive degree and are very often based on the positive degree, contrary to what it predicts (Morzycki 2016, 122–123); and so on. If dealing with gradability were to force Meaning-Dependent Grammar to side with delineation semantics, this would not be a case of being driven to a theory that was obviously less palatable than available alternatives.

I conclude, then, that there are at least two potentially fruitful ways of meeting the referee's challenge. I will not attempt to decide between them here but will leave them for future research.

5 Conclusion

As I stressed in the Introduction, this article has narrowly defined goals. It has not attempted to solve any of the long-standing syntactic and semantic problems associated with adjectives, except for one: the ⟨et,et⟩ theory should be preferred to the ⟨e,t⟩ theory because it is perfectly viable in itself and because its adoption will further the project of abolishing autonomous syntactic categories under the auspices of Meaning-Dependent Grammar.

There are of course many topics on which I have not been able to touch. I will conclude by describing one of them and commending it as a topic of future research in the current framework. That is the topic of cross-linguistic preferences in adjective ordering of the kind pointed out by Hetzron (1978) and others, whereby, in the absence of a special discourse context, (105a) is fine but other orders, such as that in (105b), are odd.

(105) a. excellent small brown cardboard box
b. ??cardboard brown small excellent box

(In languages that place adjectives after their nouns, the preferred adjective order is the mirror image of the one seen above in English.) A potential threat to the current enterprise might be thought to be derivable from this phenomenon. Suppose that the different categories of adjectives that make up this ordering are marshalled above the noun in a series of functional projections, one for each category, with the adjectives that go closest to the noun (in linear order) in the functional projection that most closely c-commands it, the ones that come just before those (in English-like languages) in a projection that immediately c-commands the one just mentioned, and so on (Cinque 1994, 2010). Then, it might seem that we have different categories of adjectives that play a role in word order, and thus in syntax, even though the members of each category are of the same semantic type: ⟨et,et⟩. This might be thought to be problematic for any claim to the effect that syntactic categories can be wholly replaced by semantic types.

So it would be. But my claim in this article is not that syntactic categories can be replaced by semantic types and nothing else. The claim, to quote my first paragraph, is that the role of syntactic categories can be taken over by 'independently motivated semantic categories such as semantic types'. Other semantic categories are allowed to play a role too, then. And it is generally acknowledged that the adjective-ordering phenomenon just mentioned is regulated by semantic factors: evaluative adjectives (*excellent*) come before adjectives of size (*small*), which come before adjectives of colour (*brown*), which come before adjectives of material constitution (*cardboard*), and so on (Hetzron 1978; Valois 2017). Semantic categories, then, are sufficient to produce good descriptive generalizations in this area and have also been used in a recent very promising attempt to synthesize these generalizations into an explanatory theory (Scontras et al. 2019). Adjective ordering phenomena, then, may very well provide good support for the overall approach adopted in the current article, since they constitute a case in which a syntactic phenomenon (word order) is transparently regulated by semantic factors.

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