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A Counterfactual Analysis of Adnominal Modifiers: A Unified Approach

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Outline

1. An intersective analysis of adnominal modifier, which assumes that a modifier denotes a “set of entities”, appears to have problems (Predicate Modification in Heim and Kratzer)
2. A functional approach to subsective modifiers does not extend to intensional and privative adjectives.
3. Morzycki (2016) entertains the possibility that all ”true” modifiers are of type 1.
4. I support a variant of 2 (though not encoded in terms of a functional application approach); I support 2 in the sense that it represents the intuition that an adnominal modifier has a “restrictive meaning”; it “restricts” the meaning of the CN in some sense.

Adnominal modifiers as intersective modifiers

Heim and Kratzer (1998)

One approach: adjectives denote properties (or sets) as in (1).

(1) ⟦red⟧ = λx . x is red

(2) ⟦car⟧ = λx . x is a car

Predicate Modification (PM): the two "sets" are intersected.

(3) ⟦red car⟧ = λx . ⟦red⟧ (x) = ⟦car⟧ (x) = 1

= λx . x is red and x is a car

Problems with the intersective approach

Non-intersective (extensional) adjectives such as *big*, *small*, etc. cannot be dealt with by PM (unless the context adjusts the meaning of each adjective somehow). $[\![\text{big}]\!] \neq \{x \mid x \text{ is big}\}$

Intensional adjectives (including privative ones) are also problematic — *fake*, *alleged*, *prospective*, etc.

(4) An alleged criminal may not be a criminal. (*alleged* is intensional)

$[\![\text{alleged criminal}]\!] \not\subset [\![\text{criminal}]\!]$

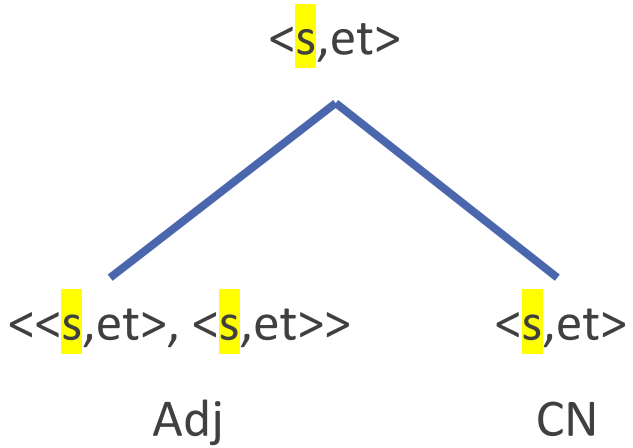
(5) A fake gun is necessarily a non-gun.

$[\![\text{fake gun}]\!] \cap [\![\text{gun}]\!] = \varnothing$ (*fake* is privative)

“(Intensional) Functional application” view of adjectives

An alternative is to regard the denotation of each adjective as a function from predicate intensions to predicate intensions (Montague 1970, Parsons 1972). Here’s the schematic representation of how the proposal works:

(6)



⟦alleged⟧ maps ⟦criminal⟧ to {<w,x> | x is an alleged criminal in w}

intensional meaning

⟦big⟧ maps ⟦ant⟧ to {<w,x> | x is a big ant in w}

Problems with the functional application view

Since it assumes that an adjective denotation is essentially a “relation between predicate meanings,” it clearly has problems with the predicative use of adjectives (used in the post-copular position in English).

(7) Robin is tall.

e <<s,et>,<s, et>>

This cannot be processed as is. (7) needs to be reanalyzed as in (8).

(8) Robin is a tall man/woman/girl/boy/person/basketball player.

e <<s,et>,<s, et>> is reduced to <s,et>

Subsective modifiers

The basic intuition that adjectives (many of them? most of them?) are subsective comes from our observations about adjectives that receive different interpretations depending on the noun: *tall*, *short*, *big*, *small*, *young*, *old*, etc.

They are called subsective adjectives (Partee 1995) in that the output is a subset of the head noun.

(9). A big ant is an ant. A small elephant is an elephant.

However, adjectives themselves do not have a set as its extension (unless their meanings are contextually specified). Technically, we can go either way (see Heim and Kratzer for example), but the important intuition is that adjectives generally carve out a subset of the noun meaning.

Intensional/modal and privative adjectives

(10) Intensional/modal adjectives: alleged, etc.

(11) privative: *fake*, *false*, etc. (necessarily non-real)

When we turn to intensional and privative adjectives (Partee 1995, Kamp and Partee 1995), we normally assume that they are not subsective. However, Partee (2007) claims that privative adjectives force noun meanings to get "wider." For example*, fake gun* refers to an entity that is not literally a gun. However, we can perhaps think of a fake gun as a special type of gun. If we are willing to extend the meaning of *gun* this way, this adjective is subsective just like other adjectives like *happy*, *skillful*, *big*, etc.

(12) I don't care whether that fur is fake or real. (Partee 2007)

Q: Could we apply a similar strategy to other adnominal modifiers?

Stone lions, paper planes

There are noun + noun combinations that yield phrases that are not compounds (cf. Kamp and Partee (1995))

Again, the subsective analysis does not yield the right result. In terms of physical characteristics, stone lions are not (real) lions; they only look like real lions and are made of stone.

Could we say that they are a special type of lions? I think there is a way of making this intuition work.

Similar example: paper plane

Interesting argument against the functional application approach

An argument against the predicate modifier view (von Fintel and Heim 1999, Landman 2001 cited in Morzycki 2016):

(13) $[\![\text{residentialous}]\!] = \lambda P \lambda y \exists x[P(x) \wedge \text{lives-in}(y, x) \wedge \text{resident}(y)]$

$[\![\text{residentialous city}]\!] = \lambda y \exists x[\text{city}(x) \wedge \text{lives-in}(y, x) \wedge \text{resident}(y)]$

$[\![\text{Mary is a residentialous city}]\!]$ = 1 iff Mary is a city resident.

The point: residentialous city = city resident — why is this unintuitive?

The intuition: *residentialous city* should be a special type of city.

Counterfactuals in the nominal domain

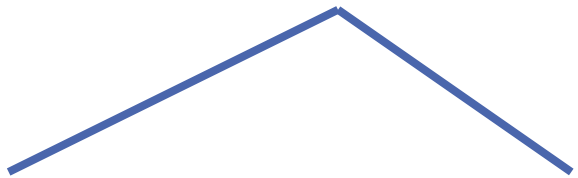
The basic idea: (i) Check ⟦CN⟧ in the actual world w_0 and select a subset of ⟦CN⟧ that have the property described by the modifier. If it is not the empty set, then it is the meaning of the entire phrase.

(ii) If there is no member of ⟦CN⟧ that has the modifier property, then the phrase denotes the intersection of the adnominal modifier meaning and a property that is distinct from the common noun meaning, but in this case, each member of the meaning would have the CN property if it obtained a crucial property that all members of CN have (e.g. in the case of *stone lion*, the property of being made of flesh and blood).

My Proposal

I propose an analysis of adnominal modifiers in which both the modifier and the modifee denote properties as in the following diagram: <s,et> via a rule of Restrictive Modification (RM)

(14)



We need a rule that combines these two expressions semantically. It combined these two properties and yields another property. This is like PM. But it yields a very different consequence.

Formalization of Restrictive Modification (RM)

(15) OPERATOR: $\lambda P \lambda Q \lambda w \lambda x \, . \, \exists R \, . \, [P(w)(x) \wedge R(w)(x) \wedge \exists S \, [Q \subset S \wedge$

$\forall w' [[w'$ is most similar to w among those in which x has $S] \rightarrow Q(w')(x)]]]$

Notation: *P, Q, R, S* are property variables (of type <*s,et*>). P: Modifier, Q: CN

Shorthand: $Q \subset S$ (Q is a proper subset of S) abbreviates

$$\forall w \forall x [Q(w)(x) \rightarrow S(w)(x)] \wedge \exists w' \exists y [\neg Q(w')(y) \wedge S(w')(y)]$$

Counterfactual reasoning: If this thing (say, a stone lion) were alive with flesh and blood, then it would be a (real) lion. (Veridical case: If the thing is already a lion (e.g., female lion), then it satisfies the condition in the actual world, so the claim being made is about the actual world (i.e., $R = Q$).

Restrictive Modification (RM) restated

(16) A structure of the form [Mod CN] denotes

$\lambda w \lambda x . \exists R . [\llbracket \text{Mod} \rrbracket (w)(x) \wedge R(w)(x) \wedge \exists S [\llbracket \text{CN} \rrbracket \subset S \wedge$

$\forall w' [[w' \text{ is most similar to } w \text{ among those in which } x \text{ has } S] \rightarrow \llbracket \text{CN} \rrbracket (w')(x)]]$

Notation: *R*, *S* are property variables (of type <*s*,*et*>).

Shorthand: $\llbracket \text{CN} \rrbracket \subset S$ abbreviates

$\forall w \forall x [\llbracket \text{CN} \rrbracket (w)(x) \rightarrow S(w)(x)] \wedge \exists w' \exists y [\neg \llbracket \text{CN} \rrbracket (w')(y) \wedge S(w')(y)]$

stone lion case: R = object?/sculpture?; S = being alive with flesh and blood

In words: there is some x made of stone such that if x had a property that any (real) lion has (e.g., being alive with flesh and blood), then x would be a (real) lion.

Lewis's "counterpart" theory across worlds

David Lewis (1968) assumes what we consider to be tokens of "the same individual" in different worlds are actually "counterparts" (and not exactly the same).

In our account we want a stone lion in the actual world to be related to a real lion in some accessible possible world. They clearly do not share the same history, but that is okay.

Counterfactuals with no “shared history”

(17) If George Floyd had been a Caucasian, he would still be alive today.

Intuitively, there is no way that one and the same person that shares an earlier part of their history can be a black person in the actual world and a white guy in a different world (or vice versa). But a counterfactual like (24) is quite common and acceptable.

Our counterfactual reasoning in the nominal domain is based on the same type of principle.

Graphical representations of some relevant examples

stone lion

(18)

real world

If it were an entity with flesh and blood, then it would be a lion

possible world

real lion

residentialous city

(19)

real world

a city resident

If it had the property of being a human settlement

Not possible →

possible world

real city??

Issues for a future research project

One cannot always take the property of the modifier as is.
Garage/parking lot: location of the sale; moving: the reason for the sale, etc.
Thus, we would need to relax the semantic condition for the modifier.

Final remarks

We have only scratched the surface of how adnominal modifiers work. Ultimately, we probably need to say that adnominal modifier provides a property that is ”about” the property that the modifier directly denotes.

But this needs further study.

Thank you!

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Any questions?

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