1. Introduction


- Topic: challenges to compositionality that arise at the intersection of lexical meaning and context.
- Data: the semantics of different semantic types of adjectives
- Question: How do we account for context-dependent meaning shifts without abandoning compositionality?
- Proposal:
  1. While contextually sensitive meaning shifts pose challenges for compositionality, compositionality plays an essential role in constraining the kinds of meaning shifts that take place.
  2. Some facts about the possibility of “NP-splitting” in Polish lead to a revised account of the (more or less) standard hierarchy of adjectives, whereby privative adjectives (counterfeit, fake and fictitious) are reanalyzed as subsective adjectives.
  3. Further independent evidence for this proposal comes from the puzzles posed by sentences like Is that gun real or fake? This requires the possibility of coerced expansion of the denotation of the noun to which an adjective is applied.

Consequence: Compositionality can be seen as one of the driving forces in such context-sensitive meaning shifts.

Questions:
- Can we distinguish ‘vague’ from ‘context-dependent’? How?
- What are the problems with treating context-dependent adjectives like tall as simply a kind of subsective adjective?
- How does Partee classify context-dependent adjectives in the intersective, subsective and nonsubsective typology?
- In what sense might context-dependence be said to challenge compositionality?
- What problems do we face if we try to define [[skillful]] and [[former]] and as sets?

Methodology:
Compositional semantic analysis is often a matter of working backward from intuitions about sentences’ truth-conditions and reasoning our way among alternative hypotheses concerning
- lexical meanings,
- syntactic structure, and
- modes of semantic composition.

Choices of anyone of those constrain choices among the others; some choices lead to dead ends or at least make things much harder; others survive. “Solutions” are rarely unique and almost never final, since they depend on on some particular set of alternative hypotheses with particular assumptions. A new idea about any part of the syntax or semantics can affect the choices among existing alternatives or open up new alternatives for consideration.

2. Introduction to adjective semantics

Consider the adjectives in the following types of examples:

(1)  a. Barnie is a pink elephant. (1a) entails (1b) and (1c).
     b. Barnie is pink.
     c. Barnie is an elephant.

d. Barnie was formerly an elephant.

(2)  a. Barnie is a small elephant. (2a) entails (2c).
     b. Barnie is small.
     c. Barnie is an elephant.

(3)  a. Barnie is a former elephant. (3a) DOES NOT entail (3c).
     b. *Barnie is former.
     c. Barnie is an elephant.
     d. Barnie was formerly an elephant.

2.1 The typology: Basic classification of adjectives

- **Intersective:** *pink, sick, carnivorous, blond, rectangular, French.*
  Barnie is a pink elephant = Barnie is pink ∧ Barnie is an elephant.
meaning postulate: $[\text{pink N}] = [\text{pink}] \cap [\text{N}]
example: $[\text{pink elephant}] = [\text{pink}] \cap [\text{elephant}]$

• **Subsective:**
  - *typical, recent, good, perfect, legendary, skillful.*
  - skillful surgeons constitute a subsection of the set of surgeons:
  meaning postulate: $[\text{skillful N}] \subseteq [\text{ N}]$
  example: $[\text{skillful surgeon}] \subseteq [\text{ surgeon}]$

• **Nonsubsective:**
  - (i) “plain” nonsubsective (no entailments at all, no meaning postulate needed):
    - potential, alleged
    - an alleged murderer may or may not be a murderer
  - (ii) privative; former, alleged, counterfeit
    neither intersective nor subsective:
    $[[\text{former senator}]] \neq [[\text{ former}]] \cap [[\text{senator}]]$
    $[[\text{former senator}]] \not\subseteq [[\text{senator}]]$
    entail the negation of the noun property:
    meaning postulate: $[[\text{fake N}]] \cap [[\text{N}]] = \emptyset$
    example: $[[\text{fake gun}]] \cap [[\text{gun}]] = \emptyset$
    *would-be, past, spurious, imaginary, fictitious, fabricated (in one sense), mythical (maybe debatable); there are prefixes with this property too, like ex-, pseudo-, non-.*

**SUMMARY:**
- **Intersective:** An adjective ADJ is intersective if
  $[[\text{ADJ N}]] = [[\text{ADJ}]] \cap [[\text{N}]]$
- **Subsective:** An adjective ADJ is subsective if
  $[[\text{ADJ N}]] \subseteq [[\text{N}]]$
- **Nonsubsective:**
  - (i) An adjective ADJ is nonsubsective if
    $[[\text{ADJ N}]] \not\subseteq [[\text{N}]]$
  - (ii) Privative: An adjective ADJ is privative if
    $[[\text{ADJ N}]] \cap [[\text{N}]] = \emptyset$

**2.2 Interpretation**

There are two ways to analyze adjectives:
- as predicates
- as operators (functions)

(1) a. If ADJ is intersective: $[[\text{ADJ}]] \cap [[\text{N}]]$ predicate

b. If ADJ is not intersective: $[[\text{ADJ}]] [[\text{N}]]$ operator/function

The non-interective types of adjective interpretation amount to the relevant (uses of) adjectives being analyzed as functions.

**Meaning postulates**

assume that the basic type for all adjectives is $<<s, <e, t>>, <e, t>>$.

- **Intersective** adjectives: For each intersective adjective meaning ADJ',
  $\exists x, [\text{ADJ}]'(Q)(x) \iff P(x) \land 'Q(x)]$.

expressions of type $<e, t>$ denote sets of individuals
expressions of type $<s, <e, t>>$ denote properties of individuals

Alternatively, intersective adjectives (and only those) can be interpreted in type $<e, t>$. This automatically guarantees their intersectivity and eliminates the need for a meaning postulate. Type-shifting rules of the sort described in Partee (1995) will give them homonyms of type $<e, t>, <e, t>>$ when needed.

Partee (1995:345) **Predicate-to-Prenominal Shift:**

If ADJ has an interpretation as denoting a set $S_{\text{ADJ}}$, then that ADJ also has a possible interpretation as a function applying to a set, namely as the function $F_{\text{ADJ}}$ such that $F_{\text{ADJ}}(S_N) = S_N \cap S_{\text{ADJ}}$.

- **Subsective** adjectives: For each subsective adjective meaning ADJ',
  $\forall x, [\text{ADJ}](Q)(x) \iff Q(x)$.

The “plain” **nonsubsective** adjectives (alleged, possible) have no meaning postulate; this class is “noncommital”: an alleged murderer may or may not be a murderer.

- **Privative** adjectives: For each privative adjective meaning ADJ',
  $\forall x, [\text{ADJ}](Q)(x) \iff 'Q(x)]$.

The privative adjectives (fake, counterfeit) have a “negative” meaning postulate; a fake gun is not a gun.

On this classification, adjectives form a hierarchy from intersective to subsective to nonsubsective, with the privative adjectives an extreme case of the nonsubsective adjectives. This can be taken to mean that no adjectives are privative (p.157), since privative adjectives are reanalyzed as subsective adjectives.
3 Vagueness and context dependency

The case of adjectives like small, tall, large.

Kamp (1975) added an important dimension to the discussion in arguing that adjectives like tall, which at first sight seem to be nonintersective, are actually intersective but vague and context-dependent.

How can we tell the difference between truly nonintersective subsective adjectives like skillful and intersective but vague and context-dependent adjectives like tall?

• First argument. Keep the ADJ–N sequence constant but change other aspects of the context. That can help to show whether it is the intension of the noun that is crucial.

a) My two-year-old son built a really tall snowman yesterday.

b) The linguistics students built a really tall snowman last weekend.

(Kamp (1975), and Hans Kamp & Barbara Partee in Chierchia and Sally McConnell-Ginet, 2000, p.463ff.)

Such adjectives as tall, small, large describe properties that are vague and highly dependent on context. For example, what counts as tall depends on or is relativized to contextual factors. In some cases, the head noun, can set the standard for subsective or relative adjectives: For example, in Barnie is a small elephant being small is relative to the property of being an elephant. Barnie is a small elephant can be taken to mean that Barnie is small for being an elephant, or with respect to the size of a standard, prototypical elephant.

• Second argument (Siegel 1976b).

—Nonintersective subsective adjectives like skillful occur with as-phrases, as in skillful as a surgeon.

—Intersective but vague and context-dependent adjectives like tall take for-phrases to indicate comparison class: tall for an elephant.

An adjective can be nonintersective and also vague, and then we can use both an as-phrase and a for-phrase: very good as a diagnostician for someone with so little experience.

(2) a. Barnie is a small elephant
   = Barnie is an elephant ∧ Barnie is small for an elephant

b. X is ADJ N = X is N ∧ X is ADJ for N

What counts as small here for evaluating the sentence a depends not just on standards set by the property of being an elephant but also on other factors: Barnie might be a toy elephant or an elephant in a zoo. So we may propose that small means something like ‘of a size less than the contextually salient standard’. How the contextually salient standard is established for each given utterance of the word small is a complex affair. Previous discourse and non-linguistic circumstances of the utterance play a role.¹

(3) X is ADJ N = X is N ∧ X is ADJ for F
   where F is some standard (comparison class)
   that is figured out from context, and often F = N.
   (see Parsons 1990, p.44)

An outstanding issues: The line between vague and nonvague predicates is vague; a concept may count as sharp for most purposes but vague relative to the demands of scientific or legal or philosophical argument. Probably almost every predicate is both vague and context-dependent to some degree.

4 Privative adjectives as a class of subsective adjectives

counterfeit, fake, fictitious, real, genuine

Among many other debated points is the question of whether an adjective like fake or an adjectively used noun like toy is really privative. One problem is the tension between the apparent truth of (a) and the undeniable well-formedness and interpretability of (b):

(1) a. A fake gun is not a gun [= a real gun].

   b. Is that gun real or fake?

(1b): Normally, in the absence of a modifier like fake or real, all guns are understood to be real guns, as is evident when one asks

(2) How many guns [= real guns] does the law permit each person to own?

Prediction of the analysis of adjectives like fake as privative adjectives:

Let’s suppose: gun [= real gun]

Let’s assume that fake is privative, then fake gun [= real gun] would entail the negation of the noun property, since we have the meaning postulate:

¹ For the apparent exceptions like tall, large, small, wide, old (in the sense of age), (Kamp 1975) gave arguments that they should be analyzed as vague intersective (i.e. <e,t>) modifiers rather than as intensional modifiers. Their vagueness involves a comparison class, and the context has to help provide one. The accompanying noun is often the most salient cue, but not always, as illustrated in an example from (Kamp and Partee 1995). If these vague adjectives are considered to have invisible relativization to a contextual parameter that sets ‘how tall is tall’, i.e. where the ‘positive extension’ of the adjective cuts off, then apparent violations of Permutation and Drop for these adjectives are only apparent, not real. They result from changing the sentence in such a way that our most natural assumptions about the contextual standards will shift, and therefore we are interpreting the modifiers differently in the premise and the conclusion. When we make the standards explicit, we see that the arguments are indeed valid. There is no analogous way to ‘save’ the arguments in the case of the really intensional modifiers.
In interpreting a sentence like
(1) a. A fake gun is not a gun (= a real gun).

the first occurrence of gun, modified by fake, undergoes a meaning shift, i.e., it undergoes a coerced expansion of its denotation, whereas the second, unmodified, occurrence does not shift.

• Without the coerced expansion of the denotation of the noun gun, not only would fake be privative, but the adjective real would always be redundant, which is clearly not desirable.

• So we need the coerced expansion of the denotation of the noun to which an adjective is applied.

• Such coercion can be motivated by treating the constraints on possible adjective meanings as presuppositions that must be satisfied by any use of an adjective; the corresponding coercion of the meaning of a noun may then be seen as a form of the presupposition accommodation, i.e., accommodation of the presuppositions associated with an adjective.

the “pragmatic” view of presuppositions as involving requirements on the common ground, the body of shared assumptions of the participants in a conversation.

• Conclusion: So in interpreting a question like (13b) Is that gun real or fake? or sentences like (20b) I don’t care whether that fur is fake or real, Partee (2007) proposes, that we actually expand the denotation of ‘fur’ to include both fake and real fur.

Kamp and Partee (1995) introduced a number of principles that govern the “recalibration” of adjective interpretations in context. Two of them are directly relevant for our purposes:

Non-Vacuity Principle (NVP): In any given context, try to interpret any predicate so that both its positive and negative extension are non-empty. (Kamp and Partee, 1995, p. 161.)

Head Primacy Principle: In a modifier-head structure, the head is interpreted relative to the context of the whole constituent, and the modifier is interpreted relative to the local context created from the former context by the interpretation of the head. (Kamp and Partee, 1995, p. 161.)

Applied to ADJ + N constructions: one first interprets the noun in the given context (ignoring the adjective), and then “recalibrates” the adjective as necessary. (Kamp and Partee 1995.)

(3) a. giant midget (a midget, but an exceptionally large one)
   b. midget giant (a giant, but an exceptionally small one)

The Non-Vacuity Principle and the Head Primacy Principle cooperate to account for the fact that the truth of (4b) is compatible with a nonredundant use of the modifier in (4a).

(4) a. This is a sharp knife. (24a)
   b. Knives are sharp. (Kamp and Partee, 1995, p. 162.) (24b)

The Head Primacy Principle is not an absolute, since
(i) it would wrongly exclude the shift in the interpretation of the head noun under coercion by a privative adjective like fake, as in fake gun.

(ii) “constitutive material” modifiers that occur in examples like stone lion, wooden horse, velvetine rabbit, rubber duck. Here, the nouns shift from their literal meaning to a meaning “representation/model of . . .”

Such an extremely productive and “easy” shift of the noun is triggered by the necessity to satisfy the Non-Vacuity Principle. The Non-Vacuity Principle overrides the Head Primacy Principle.

References
Addendum: Syntactic categories, extensional and intensional semantic types

• Fregean semantics: extensional semantic types

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<tr>
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<th>REFERENCE</th>
<th>SEMANTIC TYPE</th>
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<td>It is snowing.</td>
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<td>t</td>
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<td>NP</td>
<td>the president of US</td>
<td>individual concept</td>
<td>e</td>
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<tr>
<td>VP</td>
<td>is walking</td>
<td>property / concept</td>
<td>e → t</td>
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• possible world semantics: intensional semantic types

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<th>SENSE</th>
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<th>SEMANTIC TYPE</th>
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<td>S</td>
<td>It is snowing.</td>
<td>function from possible worlds to truth values proposition</td>
<td>s → t</td>
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<tr>
<td>NP</td>
<td>the president of US</td>
<td>function from possible worlds to individuals individual concept</td>
<td>s → e</td>
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<tr>
<td>VP</td>
<td>is hungry</td>
<td>function from possible worlds to sets of individuals property of individuals</td>
<td>s → [e → t]</td>
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Semantic types in Montague’s intensional logic (see Dowty et al 1981:160)

• Since individuals are denoted by expressions of type e, INDIVIDUAL CONCEPTS are denoted by expressions of type <s,e>. Expressions of this type include variables, constants and also expressions formed by prefixing the intension operator to expressions of type e.
  Example: If d is a name, ‘d’ is of type <s,e>.

• Since one-place predicates of individuals are of type <e,t>, expressions of type <s, <e,t>> will denote PROPERTIES OF INDIVIDUALS.

• Since formulas are of type t, expressions of type <s,t> will denote PROPOSITIONS (the intensions of formulas).

• The denotation of an expression of type <a, t> (or [a→t]) denotes a SET of whatever things are denoted by expressions of type a.

Examples:

expressions of type <e,t> denote sets of individuals
expressions of type <e,t>, t> denote sets of sets of individuals
expressions of type <s,<e,t>, t> denote sets of individual concepts
expressions of type <s,t>, t> denote sets of propositions

• The denotation of an expression of type <s, <a,t>> (or [a→t]) denotes a PROPERTY OF whatever things are denoted by expressions of type a.

Examples:

expressions of type <s, <e,t>>, t> denote properties of individuals
expressions of type <s, <s, <s,t>>, t>, t> denote properties of propositions
expressions of type <s, <s, <s,e,t>>, t>, t> denote properties of properties of individuals

• Intensional type <s, a> are functions from indices (possible worlds) to denotations of the type a.