

# Homework 2 MODEL ANSWER Q1-Q3

## L98: Introduction to Computational Semantics

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### 1 Question 1

Consider the following sentences:

- (1) a. Sandy threw the hay off the truck.
- b. Kim showed off his knowledge in the classroom.
- c. Kim showed Alex cacti in a garden off the highway.

Draw a phrase structure tree for these sentences, using a formalism like the one used in lectures (which is a simplified XBar grammar).)

#### **ANSWER:**

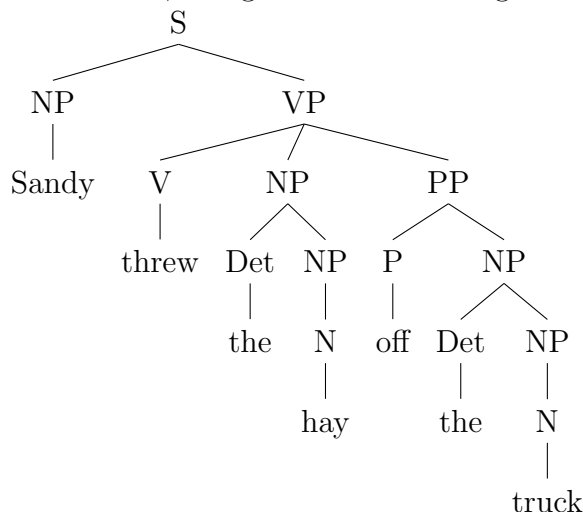
“off” acts as the preposition heading a PP in sentences 1a) and 1c), whereas in 1b) it is part of the phrasal verb “show off”. That means that its POS in 1b) is a particle . The difference between 1a) and 1b) is the function of the PP in the sentence. In 1a), it is subcategorised by the verb, in 1c) it is a modifier.

We can easily see that it’s subcategorised in 1a) because it cannot be omitted without affecting the grammaticality of the sentence:

- (2) \* Sandy threw the hay.

We can also see that it is a directional PP, not a locational PP. The directional sense of “off” is roughly “in a downwards direction so that it ends away from the higher position where the action starts”. “threw” is a ditransitive verb in 1a). This means that its two subcategorised arguments,

“the hay” (NP) and “off the truck” (directional PP) must be sisters in one production rule, along with the subcategorising verb itself.



(Side remark about the internal structure of the definite NP (i.e., NP headed by a definite or demonstrative determiner) in my trees: The exact status of the sister node of the determiner (here shown as “NP”) is debated by various theories. Here, I obviously used the rules

NP → Det NP  
NP → N

to analyse a definite NP. have not penalised if anybody used the rule

NP → Det N

which we also used in other parts of the course.

Why is this so complicated? Because we need an NP-type node that is capable of picking up all modification (where the modifier has a sister and a mother of the same category), and where all this modification happens before the NP-type phrase is combined with the determiner. There is much linguistic evidence that this is the correct internal structure of a fully specified NP, and you will see this analysis in some upcoming trees. (Side-remark to side-remark: How are these treated in the various syntactic theories? In the X-bar theory, all nominal heads before composition with the determiner are called  $\bar{N}$  (pronounced N-bar), and modification happens at that level (i.e. sister of modifying phrase is  $\bar{N}$ ; mother of phrase is also  $\bar{N}$ ):

$\text{NP} \rightarrow \text{Det } \bar{N}$

$\bar{N} \rightarrow \bar{N} \text{ PP}$

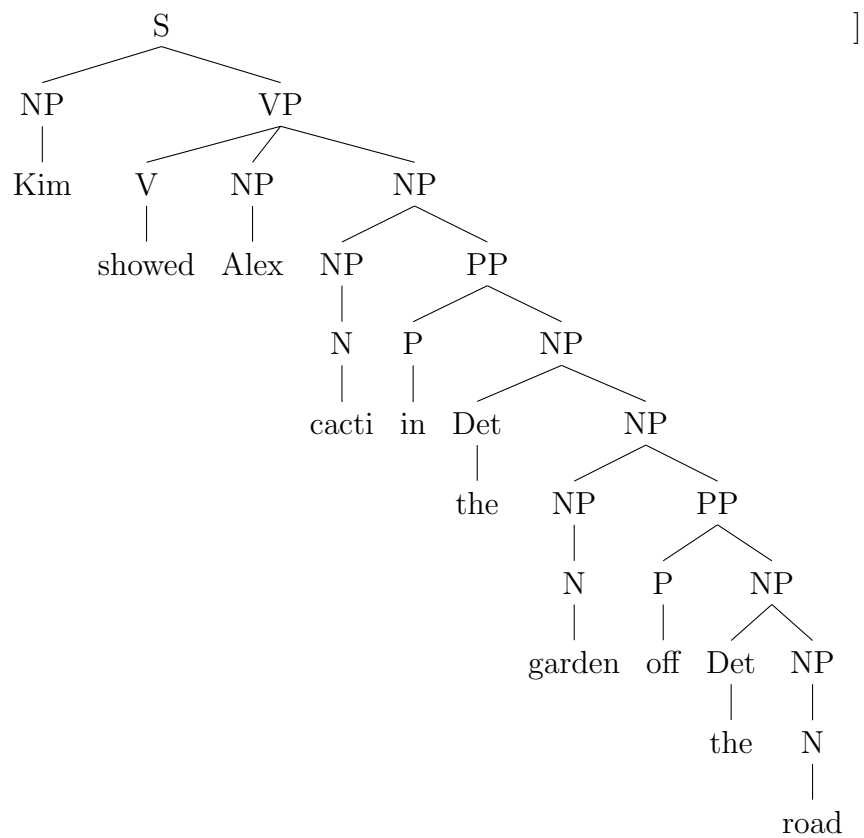
We simulate this analysis here by unifying  $\bar{N}$  with NP.

In many syntactic theories, the DP stands for the saturated (specified) NP. In HPSG, internal feature structure of the NP tells us about its immediate status.) We didn't have time on the course to go into all these details, so I was accepting all vaguely plausible trees. L98 is currently attempting to be "theory-neutral" and has to live with the above-mentioned NP compromise. Back to the example sentences now.)

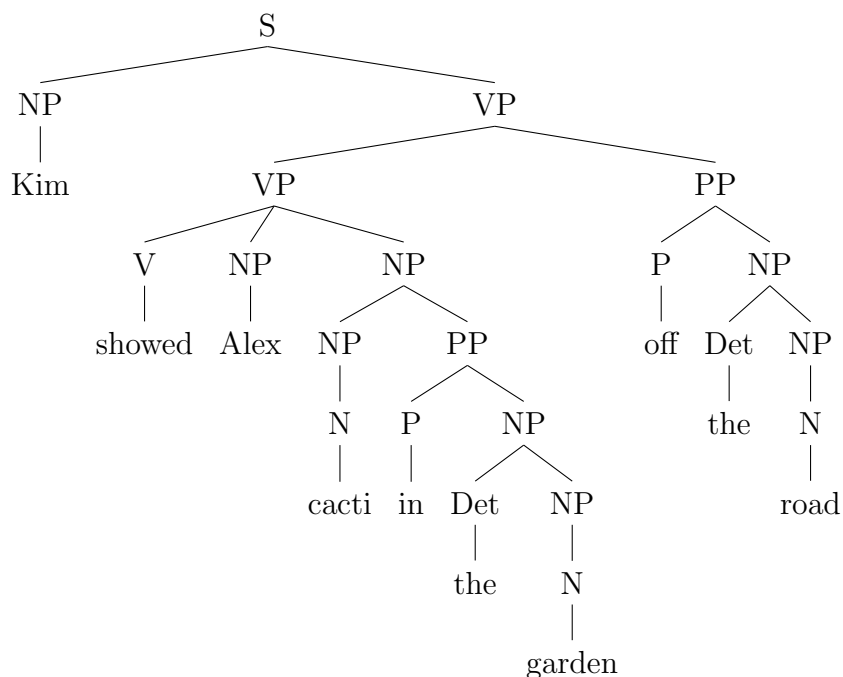
In 1c), the PP "off the highway" is locational, not directional, and it's not subcategorised by anything. The locational meaning of "off" is roughly "somewhere a bit away from". It's a modifier. I can drop it without creating ungrammaticality:

(3) Kim showed Alex cacti in a garden.

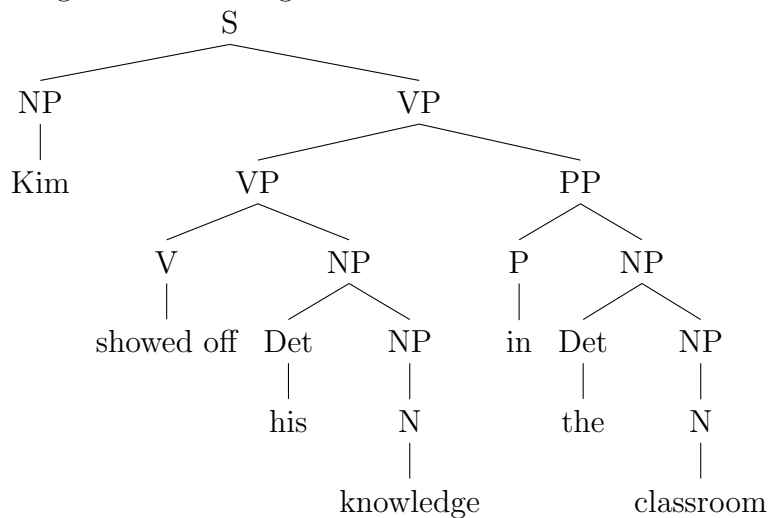
The PP most likely modifies the garden, but it could also modify the showing event. In my understanding of the sentence, it could not modify the cacti. Because I prefer the garden analysis, here it is:



But I also counted as fully correct an analysis where the modification happens at VP-level:



The phrasal verb “show off” is a MWE, and it’s entirely non-compositional. It is one morpheme, one lexical entity, and “off” has no truth-conditional meaning in it at all. In the version seen here, the phrasal verb is transitive, ie., it subcategorises “knowledge”. “in the classroom” is not something that is potentially subcategorised by “knowledge” so it must be a modifier, resulting in the following tree:



## 2 Question 2

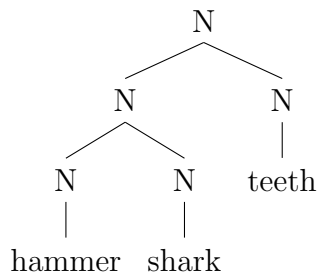
Consider the following compound nouns:

- (4) a. hammer shark teeth  
b. hammer storage shed

For each compound noun, draw a phrase structure tree, and explain which factors were relevant in the semantic composition of the compound noun. You will receive points for meaningful composition descriptions that take the semantic properties of the parts into account, as opposed to shallow descriptions such as simple rephrasings. Are the composition styles you observe productive or idiosyncratic?

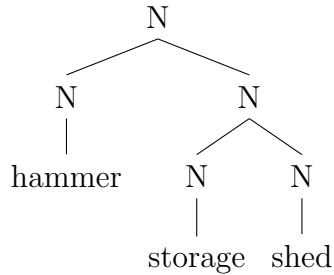
**ANSWER:**

“Hammer shark” is a species name. It’s idiosyncratic rather than productive because the shape of the snout of this shark is reminiscent of a hammer. This of course is a coincidence and does not generalise, for example to other tools. (There is no “screwdriver shark”). As far as the relationship between the head of “hammer shark” and “teeth” is concerned, it is a part-of (meronymy) relationship. This part of the compounding we can observe here is productive, as we have “rabbit ear”, “dog paw” etc. We therefore have an (unusual) initial right-branching in this compounds. This is quite unambiguous, as the hammer cannot modify teeth in an obvious way.

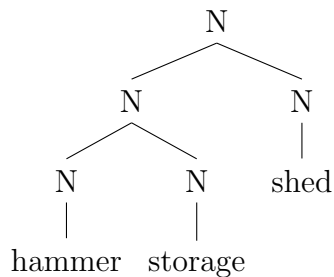


A hammer storage shed is a shed for the storage of hammers. The relationship between “storage” and “shed” is what Pustejovsky would call “telic” – it’s the function of the shed to store things. is the function of “shed”. This generalises to a certain degree, e.g., gardening shed is a shed for gardening, potting shed is a shed for potting in, maybe a partying shed is a shed for

partying in. The combination of hammer with storage shed is a specialisation of storage by the direct object of storing. What is being stored? This generalises in a big way: hay storing shed; present storing shed; golf ball storing shed.



Could we have read this another way? Could it be that there is “hammer storage” as a big human need, which is fulfilled in many ways, for instance by ((hammer storage) hangars), ((hammer storage) cupboards), ((hammer storage) racks). This is a possible, although not necessarily very plausible analysis.



In any case, it is also the case that the slight ambiguity in bracketing here would not change things semantically. But this is in stark contrast to the situation in 4a), where it was near-impossible to find a logical connection between hammer and teeth that would have enabled a leftbranching analysis, and where the tree I drew above is the only possible interpretation.

### 3 Question 3

Consider the following pairs of phrases:

- (5) a. best-selling writer  
b. best-selling novel
- (6) a. prize-winning builder  
b. prize-winning house

**ANSWER:**

In selling events, there is a SOLD-ITEM and a SELLER. The writer is a plausible SELLER and the novel is a plausible SOLD-ITEM. In winning events, there is a PRIZE (but that is already taken up in the compound adjective “prize-winning” itself, so not available). Other than that, there is only a COMPETITOR. Unlike in the selling event, both the house and the builder can be seen as the COMPETITOR (although in the real world, the builder enters the house into the competition). So in sentences 4a and 4b, house and builder fulfill the same semantic role, whereas in sentences 3a, 3b, there is a different semantic role being filled. This is the core phenomenon I wanted students to see, as it requires explanation.

There is also something to consider that we discussed in connection with Levin’s theory in lecture 3: “sell” is able to undergo iochative alternation. That is why we can say that “this book is selling well”. In this case, the alternation concerned has turned the patient into the subject of this construction, and the adjectivization works purely syntactically. This is an acceptable way to describe the phenomenon (course is theory-neutral).

There is another way to analyse this linguistic riddle. Maybe the writer and the novel do fulfil the same semantic role, but some kind of metonymy has taken place, so that the author is suddenly standing in for the SOLD-ITEM? I also counted this type of analysis as fully correct.