Modification and definite descriptions

1 Review of rules

(1) **Terminal Nodes (TN):**
If α is a terminal node, $[\![\alpha]\!]$ is specified in the lexicon.

(2) **Non-branching Nodes (NN):**
If α is a non-branching node, and β is its daughter node, then $[\![\alpha]\!] = [\![\beta]\!]$.

(3) **Functional Application (FA):**
If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ is a function whose domain contains $[\![\gamma]\!]$, then $[\![\alpha]\!] = [\![\beta]\!]([\![\gamma]\!])$.

2 How to study the meaning of a part

Using the Principle of Compositionality, we can figure out the meaning of individual parts of sentences.

(4) Kara **and** Tama sleep.

(5) John likes **himself**.

(6) Sarah swims **again**.

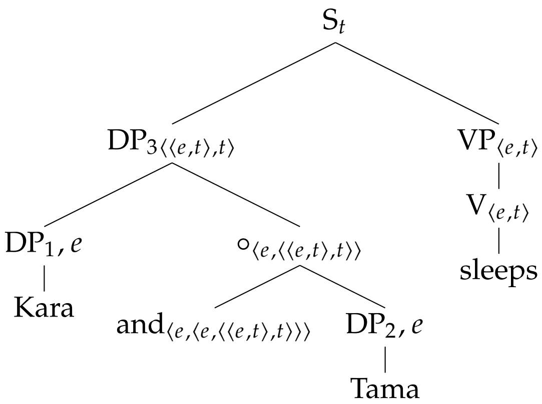
Step by step:

1. What does the whole sentence mean? Paraphrase without using the target part (in bold).
2. What is the structure of the sentence? Draw a tree.
3. Fill in semantic types. Use the Triangle Method if necessary.
4. Using your paraphrase from Step 1, work backwards to figure out the meaning of the target part (in bold).
   - Make sure the meaning you write for the target part is general: it should not include meanings which are contributed from other material in the sentence.
   - Remember that each λ should correspond to a variable in the return value. When you add a λ variable, make sure it's used.
5. Check that your final meaning matches the predicted type. Recompute the structure bottom-up to make sure it works. Make sure the meaning you proposed also works in other, similar examples.

Sample answer:

(4) Kara and Tama sleep.

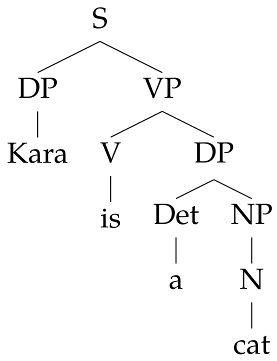
First, to figure out the types. The important thing to note is that there is no plural "Kara+Tama" in D_e. This teaches us that the type of the DP "Kara and Tama" cannot be type e. The only other option (using the Triangle Method, using Functional Application) is type $\langle\langle e,t\rangle,t\rangle$. Our goal is to figure out a way to get (3) to mean the same thing as "Kara sleeps and Tama sleeps."



- $[\![\text{VP}]\!] \underset{NN}{=} [\![\text{sleep}]\!] \underset{TN}{=} \lambda x_e \,.\, x \text{ sleeps}$
- $[\![\text{DP}_1]\!] \underset{TN}{=} \text{Kara}$
- $[\![\text{DP}_2]\!] \underset{TN}{=} \text{Tama}$
- <u>Definition of *and*:</u> $[\![\text{and}]\!] \underset{TN}{=} \lambda x_e \,.\, \lambda y_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, P(x) = 1 \text{ and } P(y) = 1$
- $[\![\circ]\!] \underset{FA}{=} [\![\text{and}]\!]\ ([\![\text{DP}_2]\!])$
  $= [\lambda x_e \,.\, \lambda y_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, P(x) = 1 \text{ and } P(y) = 1]\ (\text{Tama})$
  $= \lambda y_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, P(\text{Tama}) = 1 \text{ and } P(y) = 1$
- $[\![\text{DP}_3]\!] \underset{FA}{=} [\![\circ]\!]\ ([\![\text{DP}_1]\!])$
  $= [\lambda y_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, P(\text{Tama}) = 1 \text{ and } P(y) = 1]\ (\text{Kara})$
  $= \lambda P_{\langle e,t\rangle} \,.\, P(\text{Tama}) = 1 \text{ and } P(\text{Kara}) = 1$
- $[\![\text{S}]\!] \underset{FA}{=} [\![\text{DP}]\!]\ ([\![\text{VP}]\!])$
  $= [\lambda P_{\langle e,t\rangle} \,.\, P(\text{Tama}) = 1 \text{ and } P(\text{Kara}) = 1]\ (\lambda x_e \,.\, x \text{ sleeps})$
  $= 1 \text{ iff } (\lambda x_e \,.\, x \text{ sleeps})(\text{Tama}) = 1 \text{ and } (\lambda x_e \,.\, x \text{ sleeps})(\text{Kara}) = 1$
  $= 1$ iff Tama sleeps and Kara sleeps

3 Non-verbal predicates

(7) Kara **is a** cat.



Compositionality allows us to (a) use what we know and (b) work backwards.

(8) Kara sleeps and is a cat.

The semantics for conjunction developed in PS3 (hopefully) is only defined for conjunctions of equal semantic type.

(9) a. Austin is a city and Austin is in Texas.

b. Austin is a city and is in Texas.

c. Austin is a city and in Texas.

d. * Austin is a city and Texas.

4 Modification

(10) a. Kara is a black cat.

b. Kara is black and Kara is a cat.

(11) a. Austin is a city in Texas.

b. Austin is a city and Austin is in Texas.

Each pair of sentences in (14a,b) and (11a,b) is truth-conditionally equivalent. We call such modifiers *intersective*.

Option 1: Intuitively, *black* modifies *cat*. Write a semantics so that $[\![\text{black}]\!]$ modifies $[\![\text{cat}]\!]$ through Functional Application.

(12) $[\![\text{black}]\!] = \lambda P_{\langle e,t\rangle} \;.\; \lambda x \;.\; x \text{ is black and } P(x) = 1$

The disadvantage of this approach is that attributive adjectives (modifiers) and predicate adjectives have different semantics, although taking a predicate adjective $\langle e, t\rangle$ and converting it to its attributive form $\langle\langle e, t\rangle, \langle e, t\rangle\rangle$ is easy: Winter (pp. 82–84) does this.

Option 2: Add some glue.

(13) **Predicate Modification (PM):** from H&K
If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ and $[\![\gamma]\!]$ are both in $D_{\langle e,t\rangle}$, then $[\![\alpha]\!] = \lambda x \in D_e \ . \ [\![\beta]\!]\,(x) = 1$ and $[\![\gamma]\!]\,(x) = 1$

Now we can simply use the regular $\langle e, t\rangle$ denotations for *black* and *in Texas*.

5 Definite descriptions and presupposition calculation

(14) The black cat is in Texas.

A first approximation:

(15) $[\![\text{the}]\!] = \lambda P_{\langle e,t\rangle} \ . \ \lambda Q_{\langle e,t\rangle} \ . \ |P| = 1$ and $P \subseteq Q$
(using set notation for the predicates P and Q)

What meaning do we predict for (14)? Is that what (14) means?

(16) a. I took the elevator in AS5.
b. I took the escalator in AS5.

(17) **A "partial" semantics for the definite determiner:**[1]
$[\![\text{the}]\!] = \lambda f : f \in D_{\langle e,t\rangle}$ and there is exactly one x such that $f(x) = 1$.
the unique y such that $f(y) = 1$

(18) $[\![\text{the black cat}]\!]$ = the unique black cat
$\underbrace{\rightsquigarrow \text{ there exists exactly one black cat}}_{\text{presupposition}}$

(19) **Functional Application (revised; compare to H&K p. 76):**[2]
If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, then

- $[\![\alpha]\!]$ is defined if and only if: $[\![\beta]\!]$ and $[\![\gamma]\!]$ are both defined and $[\![\beta]\!]$ is a function whose domain contains $[\![\gamma]\!]$;
- if defined, $[\![\alpha]\!] = [\![\beta]\!]([\![\gamma]\!])$.

Exercise:

(20) I read the book on the table.

[1]A *partial function* is a function that is not defined for all possible values of its arguments.
[2]H&K describes this in terms of linguistic objects *being in the domain of* $[\![\cdot]\!]$ rather than being defined or not.