First African Summer School in Linguistics
*Syntax-semantics Interface and Cross-Linguistic Variation: Session II*
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# Session II:
# NP-Modification

## 1. The Issue

- In the previous lecture, we have seen that the meanings of verbal/predicative heads and their arguments combine by way of *function application* (FA).

- The same compositional procedure is plausibly involved in the interpretation of other head-complement configurations, such as PPs (1a), DPs(1b), and complex APs (1c):

(1) a. Peter is [$_{PP}$ *in London*]

b. [$_{DP}$ The president] is smart.

c. Peter ist [$_{AP}$ seiner Frau treu]
Peter is his$_{DAT}$ wife faithful
'Peter is *faithful to his wife*.'

**Ex.1** Determine the semantic interpretation of (1a) given that the copula *is* is semantically empty and that the preposition *in* denotes the following function with two semantic argument positions: [[in]] = $\lambda x \in D.\ \lambda y \in D.$ y is in x

**Q: Is FA the only compositional procedure, or do we need to assume more?**

**What about NP-modifying structures?**

(2) a. *black* cat
b. student *from Nigeria*

(3) a. gidaa *farii* b. yaaròo *dà sàndaa* [HAUSA]
house white boy with stick
'white house' 'boy with a stick'

c. yaaròo *mài hùulaa*
boy owner.sg cap
'boy with a cap'

## 2. The Interpretation of NP-Modifying Structures: The Problem
(cf. Heim & Kratzer 1998: ch. 4)

- *Central Observation:*

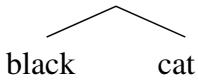
Most NP-modifying expressions are *restrictive*, i.e. they take the set of individuals denoted by the NP and restrict it to a subset by introducing a second property to be satisfied by the individuals in the complex NP's denotation.

(4) a. [[cat]] = $\lambda x \in D.$ x is a cat $\Leftrightarrow$ {x: x is a cat}

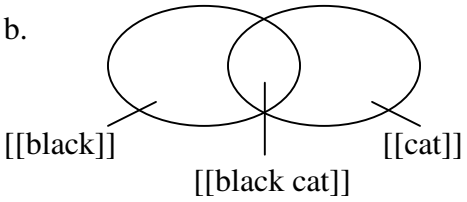
b. [[black cat]] = $\lambda x \in D.$ x is a cat and x is black $\Leftrightarrow$ {x: x is black and a cat}

$\Rightarrow$ Semantically, adjective and head noun seem to play the same role: *property-denoting*

(5) a.




b.




**Q:** If both syntactic sisters are semantically of the same type (both unsaturated 1place-predicates), how can one serve as the function and the other the argument ?

→ A problem of TYPE INCOMPATIBILITY:

## 3. **Technicalities: Type Theory** (Heim & Kratzer 1998: 26-29)

- Types of semantic objects encountered so far:

(6) a. proper names (*Audu, John, Mary*): individuals in D

b. sentences: truth-values in {0,1} (= $D_{\{0,1\}}$)

c. intransitive verbs (*run, laugh*): functions from D to {0,1}, i.e. from individuals to truth values (= $D_{<e,t>}$)

d. predicative adjectives (*powerful, sweet*): functions from D to {0,1}, i.e. from individuals to truth values (= $D_{<e,t>}$)

e. transitive verbs (*meet, hit*): functions from D to functions from D to {0,1}, i.e functions from individuals into functions from individuals to truth values (= $D_{<e,et>}$)

- The semantic nature of bare NPs: *house, cat etc.* (see (4a) above)

***bare NPs denote 1place-unsatured functions and are thus semantically parallel to intransitive verbs and (predicative) adjectives !***

→ as predicative expressions, bare NPs can function as predicates in many languages:

(7) Peter ist [$_{NP}$ Kellner]
Peter is waitor
'Peter is a waitor.'

→ Being unsatured expressions, bare NPs must be saturated by means of a definite article in many languages before they can serve as nominal arguments for verbs, prepositions etc.

(8) a. *Man called child.
b. The man called the child.

(6) f. bare NPs (without determiners) (*cat, house*): functions from D to {0,1}, i.e. from individuals to truth values (= $D_{<e,t>}$)

- Keeping track of the different kinds of semantic objects: SEMANTISCHE TYPES

"It is convenient at this point to introduce a way of systematizing and labeling the types of denotations in this growing inventory." H&K (1998:28)

(9) a. <e> is the type of individuals: $D_e = D$.

b. <t> is the type of individuals: $D_t = \{0,1\}$.

→ *e* und *t* are the only semantic types of saturated expressions

(10) a. <e,t> is the type of 1place functions (= 1place-predicates)

{f: f is a function from $D_e$ to $D_t$ }.

b. <e, <e,t>> is the type of 2place-functions (predicates)

{f: f ist eine Funktion von $D_e$ nach $D_{<et>}$}

(11) *Recursive definition of semantic types* (see H&K 1998)

a. <e> and <t> are semantic types.

b. If σ and τ are semantic types, then <σ,τ> is a semantic type

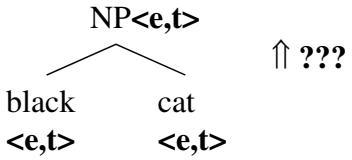
**c. Nothing else is a semantic type**

**Ex.2** Define some more possible semantic types by using the recursive definition in (11). Which of these types would plausibly qualify as the semantic types of natural language expressions?

## 4. NP-Modification: Analysis

- *The problem of type incompatibility (repeated)*

(12)




→ Both the adjective *black* and the head NP *cat* in (12) are unsaturated 1place-functions of type <e,t>, i.e. neither qualifies as a suitable semantic argument for the other

→ In addition, the determiner-less complex NP should also be of type <e,t>, i.e. nothing changes type-wise on the way from the daughter nodes to the mother node

→ We would want to account for the intuition that both daughter nodes (A and NP) play the same role for the semantic procedure: they introduce a property to be satisfied by the individuals in the semantic domain of the complex NP.

- A new compositional procedure: PREDICATE MODIFICATION

(13) *Predicate Modification (PM)* (Heim & Kratzer 1998:65):

If α is a branching node, {β,γ} is the set of α's daughters, and ⟦β⟧ and ⟦γ⟧ are both in $D_{<e,t>}$, then

⟦α⟧ = λx∈$D_e$. ⟦β⟧(x) = 1 and ⟦γ⟧(x) = 1.

(14) *Semantic derivation of (12):*

a. [[black cat]] = $\lambda x \in D_e$. [[black]](x) = 1 and [[cat]](x) = 1 (by PM)

b. = $\lambda x \in D_e$. [$\lambda$y. y is black](x) = 1 and [$\lambda$z. z is a cat](x) = 1 (lexical meanings of *black* and *cat*)

c. = $\lambda x \in D_e$. x is black and x is a cat (by $\lambda$-conversion)

**Ex.3** Derive the semantic interpretation for the modified Hausa NP *gidaa farii* 'white house' in (3a) by using predicate modification.

- Other modifiers: PP, RelS

  PM allows for the correct interpretation of all kinds of NP-modifiers including PP-modifiers (15a) and relative clauses (15b):

(15) a. student [$_{PP}$ *from Maiduguri* ]

b. student [$_{RelS}$ *that came from Maiduguri*]

→ all NP-modifiers are semantically unsaturated ans denote 1place-fucntions from individuals to truth-values (<e,t>)

(16) a. [[from Maiduguri]] = $\lambda x \in D_e$. x is from Maiduguri

b. [[that came from Maiduguri ]] = $\lambda x \in D_e$. x came from Maiduguri

→ Relative clauses are of a different semantic type (<e,t>) than main clauses (17a) and complement clauses (17b) (<t>), mirroring their different syntactic behaviour (obligatory attachment to NP):

(17) a. *Kodzo entered the bar.*

b. Kofi thinks *that Kodzo entered the bar.*

**Ex.4** Derive the meaning of (15ab) by means of PM and the semantic denotations in (16ab)

**Ex.5** What is the semantic intepretation of the object relative clause in (18)?

(18) the woman [ which$_1$ Audu invited $t_1$ ]

## 5. Further Issues & Complications

There are some NP-adjectives that do not allow for an intersective interpretation as sketched in (5b) and which therefore cannot be treated in terms of predicate modification: *intensional adjectives*

(19) a. former president ≠ {x: x is president and x is former}

b. alleged president ≠ {x: x is president and x is alleged}

→ this problem seems to extend to inherently ***vague adjec***tives, such as *big, small, expensive, cheap, heavy, light, beautiful* etc. that seem to depend on a contextually given ***standard of comparison*** for their correct semantic interpretation.

(20) a. John is a black cat.
⇒ John is black and John is a cat (compatible with PM)

b. John is a tall jockey
//⇒// John is a jockey and John is tall (incompatible with PM)
⇒ John is tall *as a jockey*

**Q:** Do we need lexical meanings of a different semantic type for vague adjectives after all?

- A POSSIBILITY: Vague adjectives as NP-selecting functions (type: <<e,t>,<e,t>>)

(21) a. $[\![\text{tall}]\!] = \lambda f \in D_{<e,t>} . \lambda x \in D_e$. f(x) = 1 and x is taller than most elements in {y: f(y)=1}]]

b. $[\![\text{tall jockey}]\!]$ = [[tall]] ([[jockey]])

= $\lambda x \in D_e$. x is a jockey and x is taller than most elements in {y: y is a **jockey**}

c. $[\![\text{tall man}]\!]$ = [[tall]] ([[man]])

= $\lambda x \in D_e$. x is a jockey and x is taller than most elements in {y: y is a **man**}

- AN ALTERNATIVE SOLUTION: Vague adjectives as type <e,t>-expressions with an implicit comparison variable.

(22) a. $[\![\text{tall}]\!]$ = $\lambda x \in D_e$. the height of x exceeds c, where c stands for a contextually salient standard of tallness

b. $[\![\text{tall jockey}]\!]$

= $\lambda z \in D_e$. [$\lambda x \in D_e$. the height of x exceeds c, where c stands for a contextually salient standard of tallness](z) = 1 and [$\lambda x \in D_e$. x is a jockey](z) = 1 (*by PM*)

= $\lambda z \in D_e$. the height of z exceeds c, where c stands for a contextually salient standard of tallness and z is a jockey

→ in the absence of further information, the contextually salient standard of tallnees will be the average tallness of jockeys …

**BUT:** The standard of comparison can come from anywhere in the discourse context:

(23) The monsters are besieging the city. There are Godzilla and King Kong, who have ganged up in order to hassle the poor city dwellers. The good Jumbo stands no chance against them. ***He is just a small elephant***.

**Q:** Does Jumbo need to be small as an elephant for the discourse to be coherent?

## 6. Conclusion

i. The meaning of NP-modifiers (As, PPs, RelSs) is semantically composed with the meaning of the modified NP by means of a new compositional procedure:
*Predicate Modification*

ii. This treatment successfully extends to instances of vague adjectives (*tall, small*) if we assume that such adjectives make reference to a contextually given standard of comparison in their lexical meaning.

**Q: How many different compositional procedures are there in natural languages apart from FA and PM?**

## 7. Homework Assignment

i. Look for two or three complex NPs with (intersective) NP-modifiers in your language and try to interpret them by using predicate modification.

ii. Identify the counterparts of vague adjectives, such as *tall*, *small, cheap, expensive* in your language. Are they syntactically realised as adjectives? If not, what is the syntactic status of the corresponding expressions? Syntactic status aside, do the corresponding expressions show the same semantic traits as their English counterparts?

iii. Unlike English, French, and German (and all the other European languages), many languages of the world do not have many, or even any adjectival NP-modifiers. Nonetheless, these languages have the semantic power to express the relevant semantic concepts by means of other syntactic constructions, such as PP-modifiers. A point in case is Hausa, which would translate English A NP *strong man* in (24a) as (24b) with a modifying PP:

(24) a. $[_{NP}\ [_{A}$ strong] man ]

b. $[_{NP}$ mùtûm $[_{PP}$ dà k'arfi]] (HAUSA, CHADIC)
man with power
'strong man'

Show that the meaning of (24b) comes out equivalent to (24a) by first identifying the meaning of Adj- and PP-modifier respectively, and then combining these meanings with the meaning of the nmoun by way of predicate modification, Assume for simplicity that abstract nouns such as *k'arfi* 'power' are of semantic type <e> and refer to abstract qualitiy individuals:

[[ k'arfi]] = power' (= the abstract quality of power)