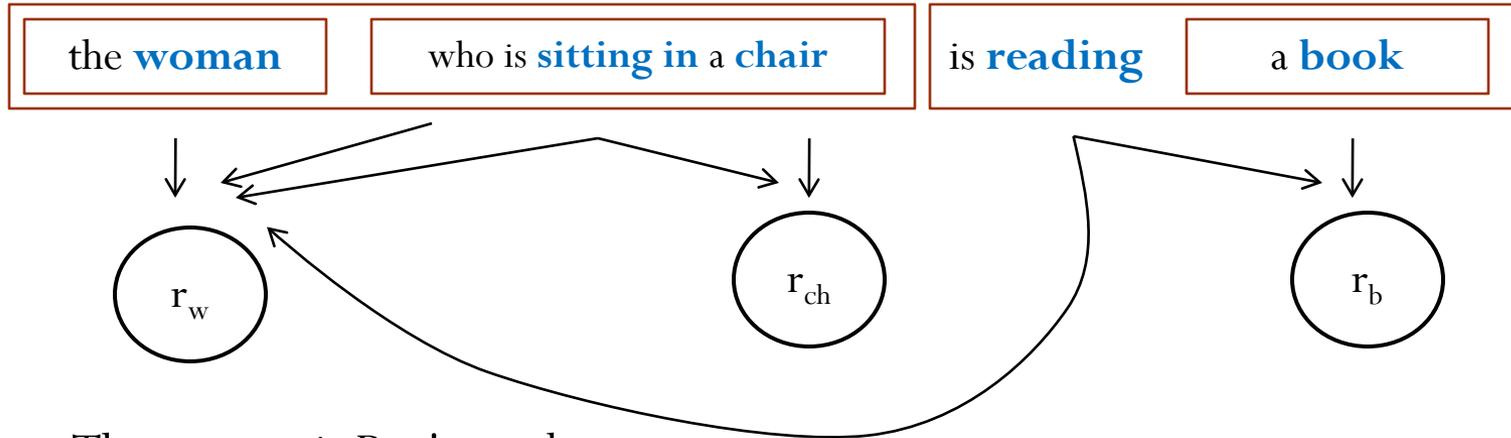
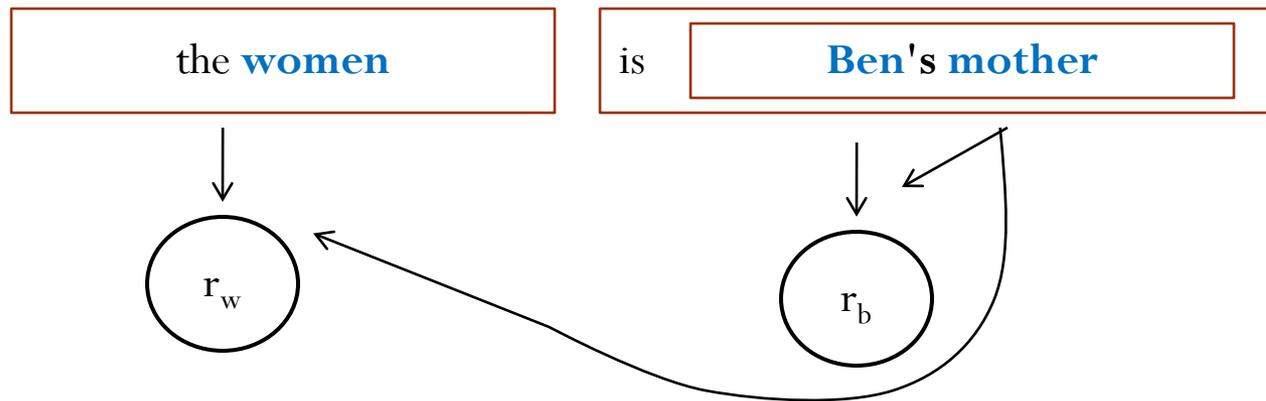


- The woman who is sitting in a chair is reading a book



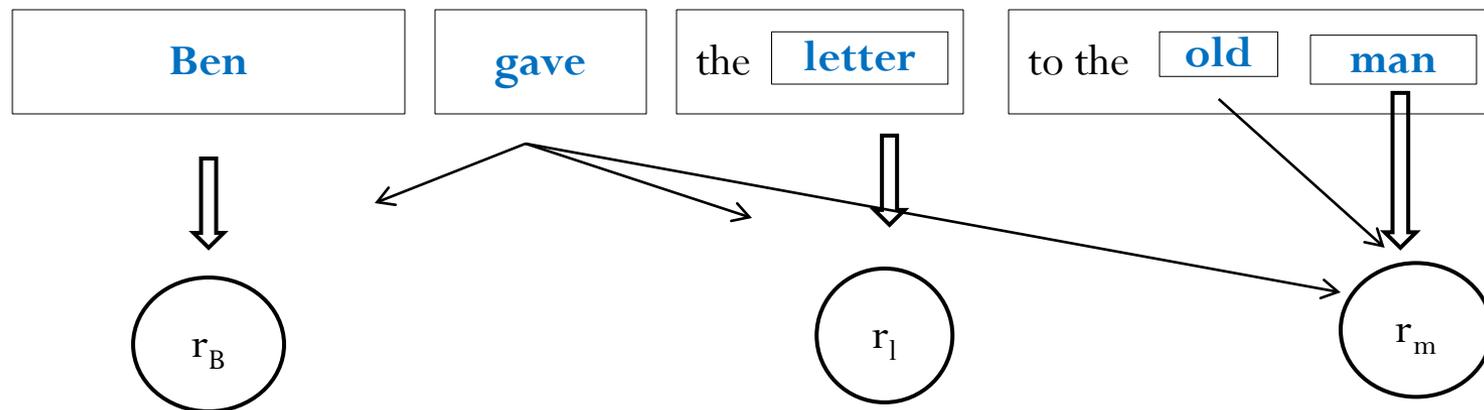
- The women is Ben's mother



❖ Predicates and arguments

- The meanings of the predicates are concepts that concern one or more entities. Such concepts are called *predicates*, the entities they concern are called *arguments*. Predicates are *applied* to their arguments. Predicates with one argument are one-place predicates , with two arguments two-place predicates, and so on
- If a predicate is applied to an appropriate set of arguments, it yields a truth value and it will be said to be true or false of its arguments.
- If we assume a context of utterance where a statement is *true*, all the predicates are true of their arguments. But in a different context of utterance, the predicates might yield the truth value *false*.
- Predicates define conditions on their arguments which they must fulfill for the predication to be true.

- The meanings of content words are *predicates*. They concern one or more entities which are their *arguments*.
- An expression (VP, AP, PP) specifying a predicate is a *predicate term*. An expression (NP, PP) specifying an argument is an *argument term*. Syntactically seen, it is a complement.
- If the argument of a predicate is at the same time its referent, it will be called the *referential argument* of this expression – cf. the referential arguments of *Ben*, *letter*, and *man* below.



- predicates allowing argument terms

DP *sleep*

Peter is sleeping

DP *give* DP

Peter gives a book to Ann

DP *sister* of DP

Ann is the sister of Bea

- predicates with referential arguments

r_c is a company

r_j is named Johnny

r_a is an application

Johnny sent an application to an dubious company.

- predicates without a referential argument are parasitic *dubious*

➤ *Major types of verbs*

• **Intransitive verbs**

They are one-place predicates. The only argument is specified by a DP (=NP) which in English, is always the *subject* of the clause.

The cat is *sleeping*.

The door *was opened*.

It *is interesting* that John passed the examen.

Whether John will come *is questionable*.

• **Transitive verbs**

They are two-place predicates with two argument terms, the *subject* and the *direct object*.

The cat is *eating* the dog's food.

He *wants* your help.

Frank *wants* John to come.

Frank *knows* that Maria is in the university.

Sentence A *relates* to sentence B.

Frank *goes* to the theater.

Frank did not *try* to *cheat* the examen.

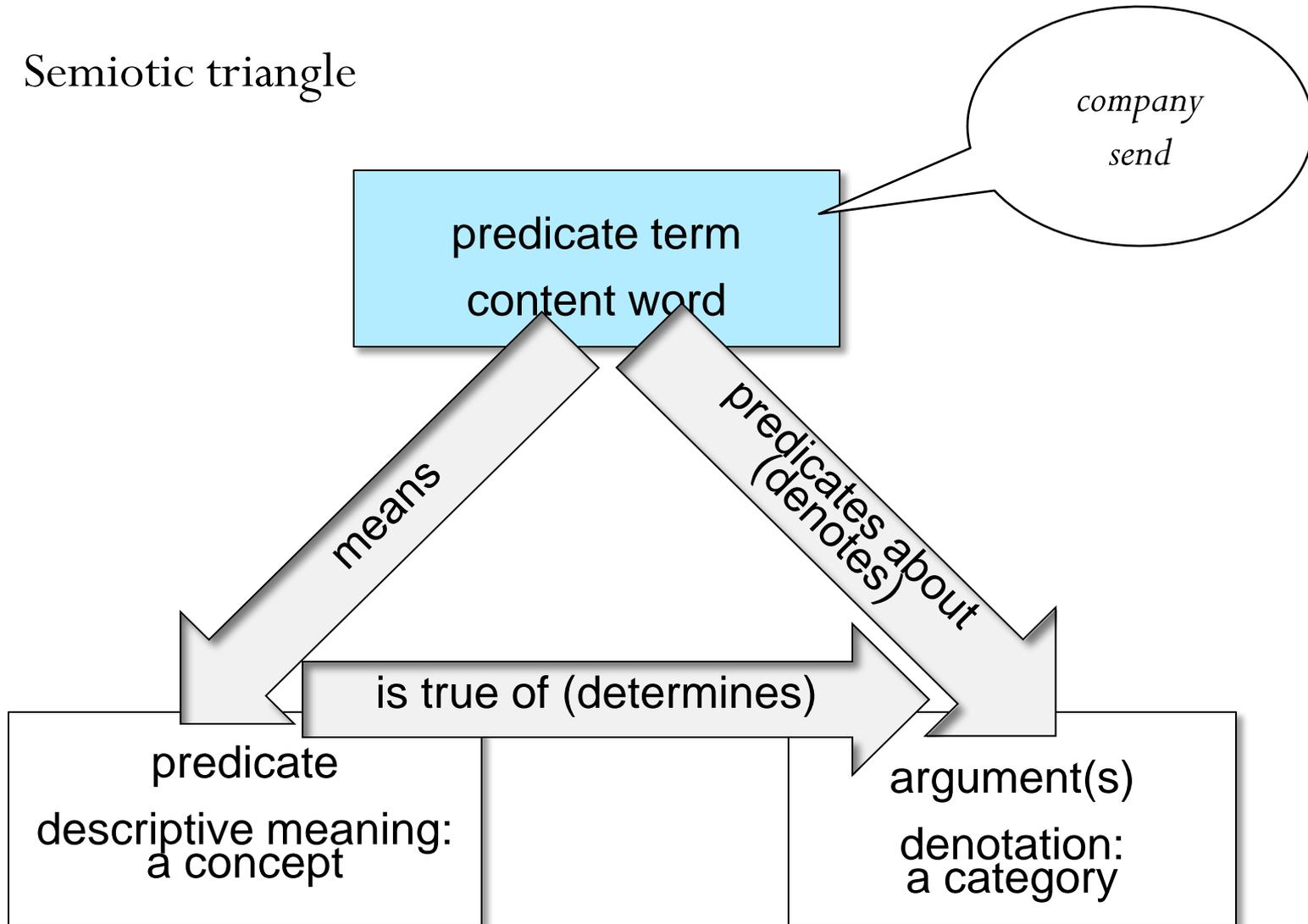
- **Ditransitive verbs**

They have three argument terms. For one group, the third argument is called the *indirect object*.

He'll *give* my sister the keys.

Frank *believes* Mary that she loves him.

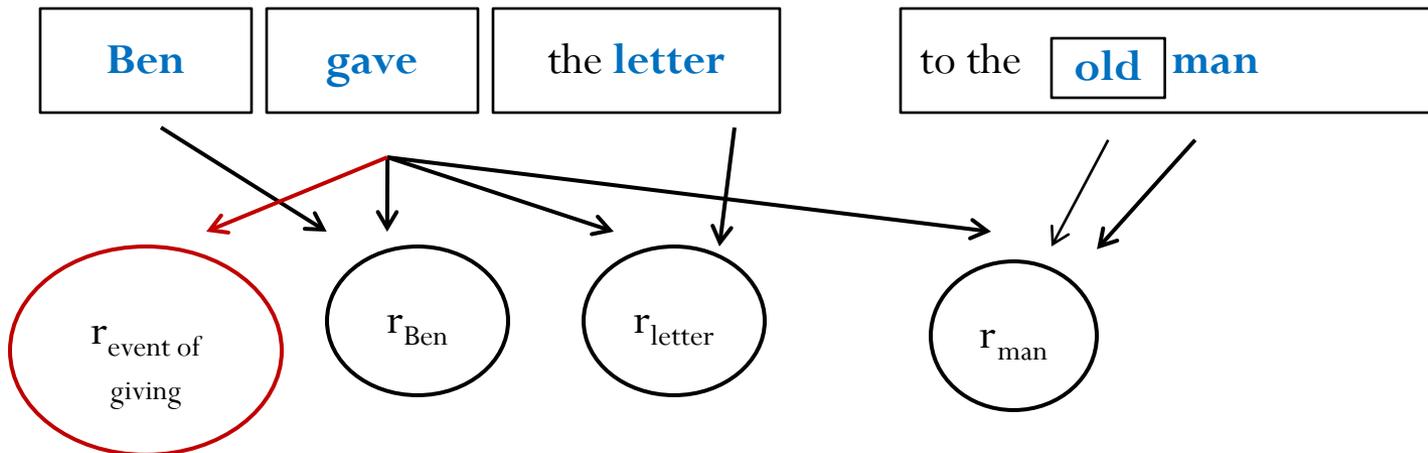
- Semiotic triangle



- **referential arguments of verbs**

Verbs are combined with an argument term for each of their non-referential arguments.

The referential argument of a verb is called *event argument* or *situation argument*. The event argument is the referent of the verb. It corresponds to an event/situation which is regarded as an abstract entity. According to the verb meaning, events can be classified.



- **Reasons to adopt a referential argument**

- argument for time predication

Jonny **sent** an application to a dubious company.

- argument of particular adverbs.

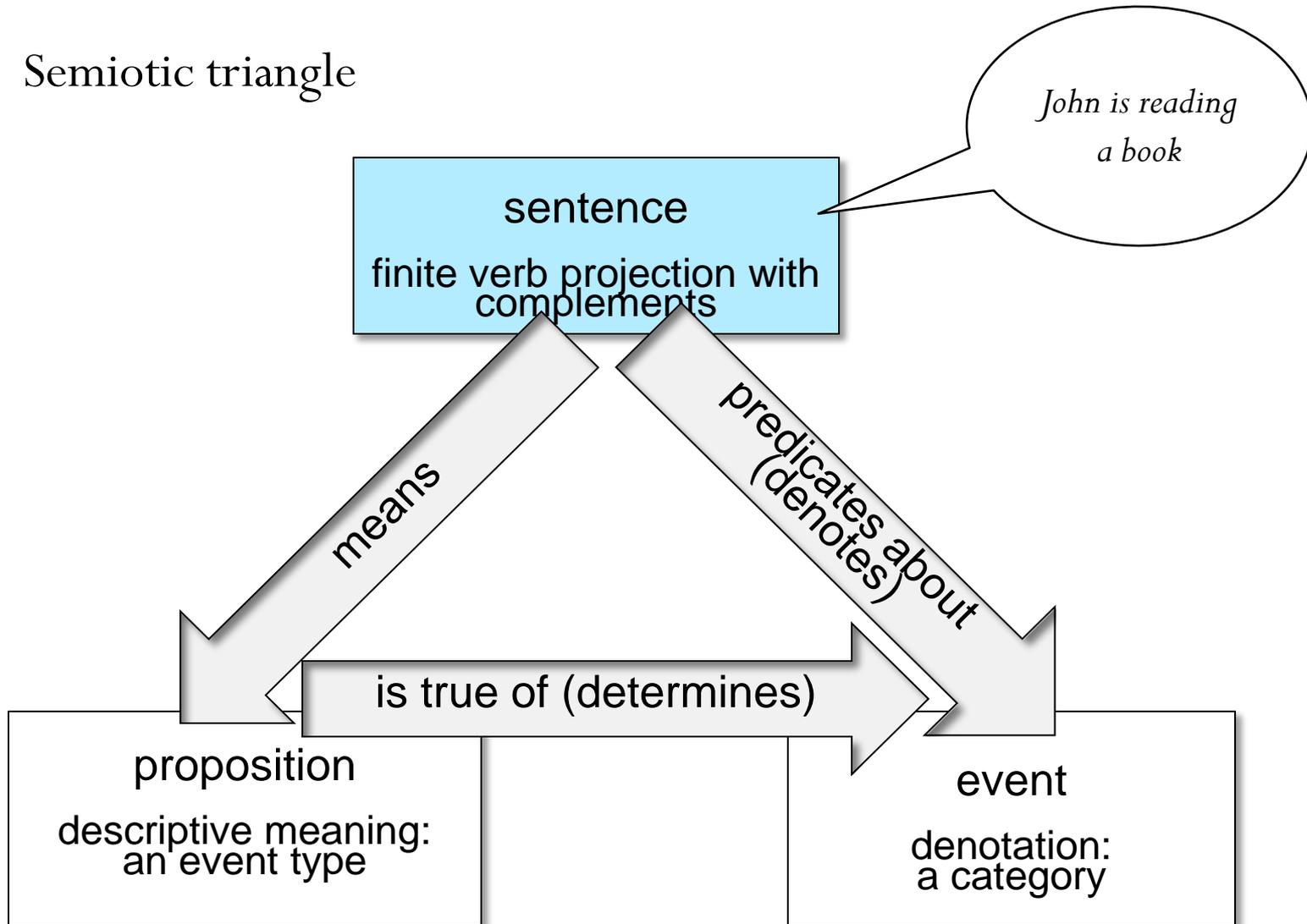
John closed the envelope **carefully**.

- nouns derived from verbs which denote an event the verb expresses.

Johnny's **sending** an application to the company did not succeed.

The **reconstruction** of the city was successful.

- Semiotic triangle



➤ Deciding on the number of arguments

It is difficult to decide how many arguments a predicate term involves since there are

- *complement number variation*

open x, y

Frank opens the door.

Transitive *open* predicates of its subject argument an action which leads to a corresponding change of state of the direct object argument.

open x

The door opens.

Intransitive *open* predicates of its subject argument a certain change of state

- *Necessary and non-necessary arguments*

eat x, (y)

Frank is eating spaghetti.

Frank is eating spaghetti with a plastic fork.

Frank is eating with a plastic fork.

Frank is eating.

Eat predicates the same of its subject argument in all examples. But only the subject and the direct object argument are necessary to describe the eating event. Therefore, eat is a two-place predicate or transitive. Its second argument need not be specified but is always involved.

➤ Nouns

- **One-place nouns**

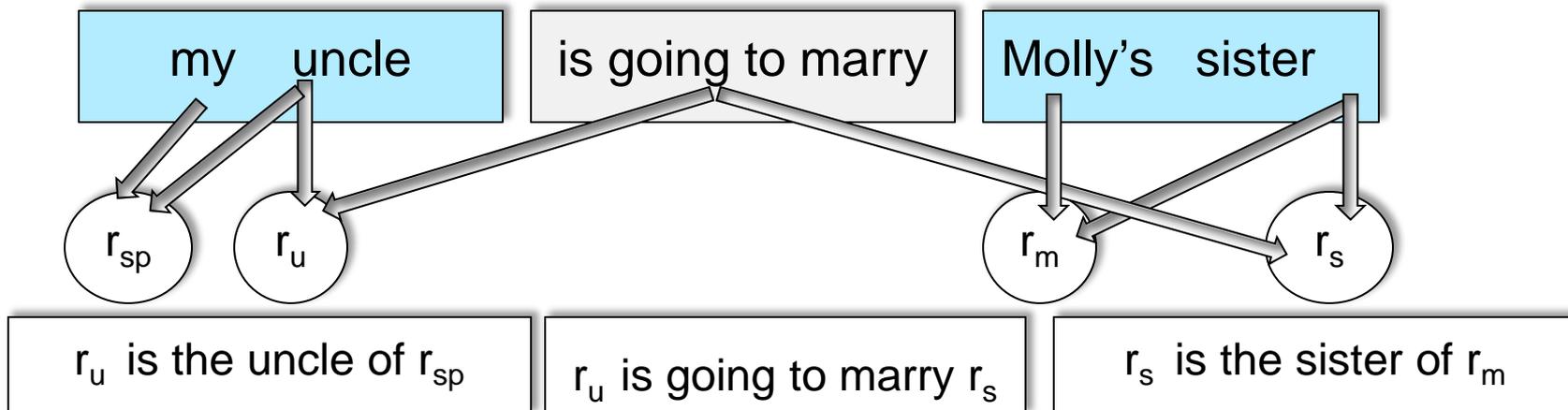
They only have a referential argument.

The *dog* managed to open the *door*.

- **Relational nouns**

They are two-place predicates. They have a referential argument and an argument that can be specified linguistically.

- My *uncle* is going to marry Molly's *sister*.



- Relational arguments are usually specified by a possessive (pronoun, genitive, *of*-PP). The specification is mostly not obligatory.
- Further relational nouns: *name of, height of, occupation of, meaning of, discontent with, attack on, ticket to, equivalence to*

➤ Adjectives

- *One-place adjectives*

- They are intransitive predicate terms if they are used in their positive form. The argument they predicate on is referential.
- The argument of an intransitive adjective is mostly

- i. the referential argument of the noun the adjective is the attribute of

Jonny sent an application to a [**dubious** company].

or

- ii. made visible by the copula *be*

The company [is **dubious**].

- The argument of an intransitive adjective need not be the referential argument of the noun.

Frank defends the alleged murderer

- The interpretation is not: r_y is a murderer and alleged, but r_y is accused to be a murderer.

- ***Two-place adjectives***

They have a second argument which is specified

- by a PP-complement. They can only be used in copula constructions.

My uncle is fond of Molly's sister.

She wore a sweater similar to yours.

- by a comparative complement

Her hair was oilier than Julio's.

I hardly imagine a book more boring than this one.

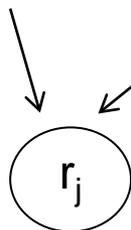
- by a Grade Phrase

The girl is six years old.

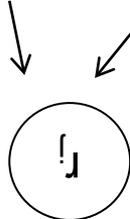
➤ Predicative use of nouns and adjectives

- Adjectives and nouns can be used predicatively.
- They are complements of the copula syntactically.
- Semantically, they are predicate terms the subject is an argument of.
- Predicative predication terms are *parasitic*, for their first argument, on the copula.

John is a teacher.



John is silly



Type	Example	Arg 1	Further arguments
V intrans	<i>the bell rang</i>	complement	∅
V trans	<i>she opened the door</i>	complement	complement
N 1-place	<i>the postman</i>	referential	∅
N relational	<i>asking her name</i>	referential	possessor
	<i>a letter from Jonny</i>	referential	complement
A 1-place	<i>a pink envelope</i>	parasitic	∅
A compar.	<i>thicker than the last one</i>	parasitic	complement
A 2-place	<i>full of pomises</i>	parasitic	complement

❖ Predication logical notation

Predicational Logic (PL) traces back to Aristoteles. In semantics, it is used for the logical analysis and to represent the sentence meaning.

➤ Basic expressions

predicate terms	individual constants	individual variables
1-place <i>salad, fork, red, sleep, dog</i>		x, y, z, \dots
2-place <i>marry, uncle, contract, see</i>	k [ken] f [frank] p [pauline] i ["ich"], ...	proposition variables p, q, s, \dots
3-place <i>give, tell, accusation</i>		predicate variables P, Q, R, \dots

➤ *Combining predicates with arguments*

- Predicates combine with their arguments.

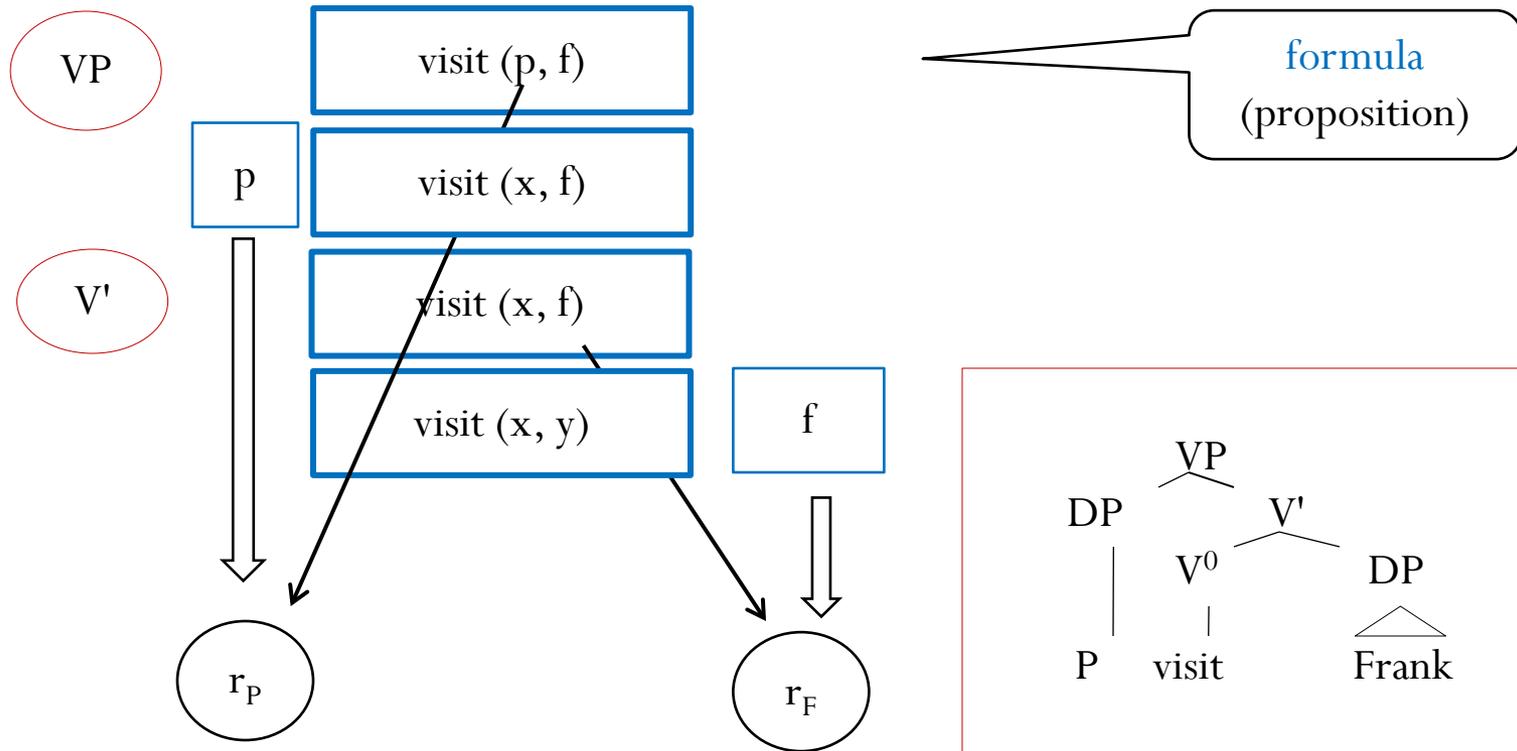
The potential arguments are represented by variable which are attached to the predicate.

salad (x)	x is a salad
explain (x, y, z)	x explains y to z
aunt (x, y)	x is an aunt of y

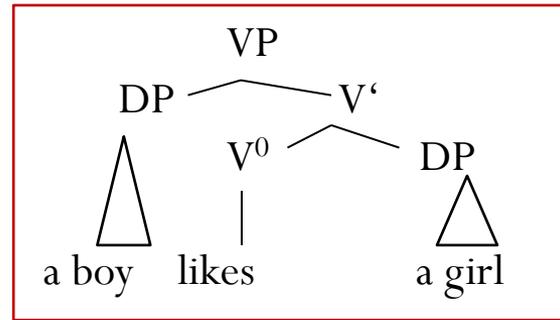
argument places of the predicate indicated by variables. The variables are specified by the arguments of the predicate.

➤ *Combination of predicates with arguments*

- *Pauline is visiting Frank.*



- *A boy likes a girl.*



open formula
(statement,
proposition)

VP

like $(\mathbf{x}, \mathbf{y}) \wedge \text{boy}(\mathbf{x}) \wedge \text{girl}(\mathbf{y})$

boy (\mathbf{x})

like $(\mathbf{x}, \mathbf{y}) \wedge \text{girl}(\mathbf{y})$

V'

like $(\mathbf{x}, \mathbf{y}) \wedge \text{girl}(\mathbf{y})$

like (\mathbf{x}, \mathbf{y})

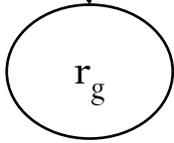
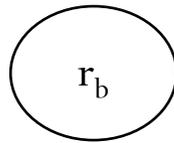
girl (\mathbf{y})

\wedge :
Propositional
logical
connector
'and'

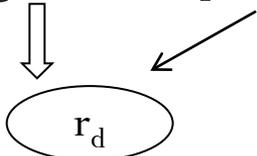
Existential operator binding the variable

$\exists \mathbf{x} \exists \mathbf{y} \text{ boy}(\mathbf{x}) \wedge \text{like}(\mathbf{x}, \mathbf{y}) \wedge \text{girl}(\mathbf{y})$

closed formula
(statement, proposition)

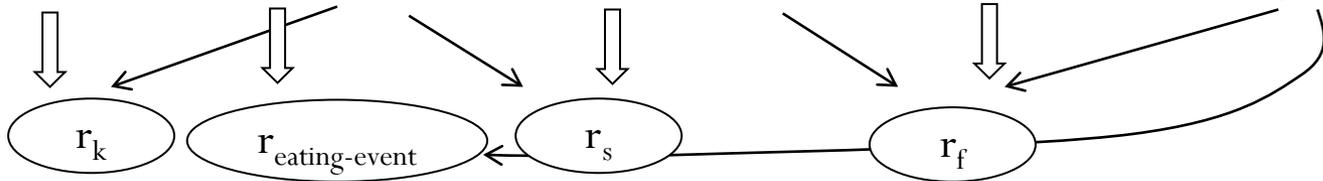


$\exists x \text{ dog}(x) \wedge \text{sleep}(x)$



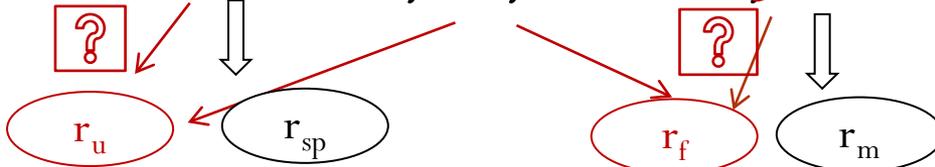
[a dog] [is sleeping]

$\exists x \exists z \text{ klaus}(x) \wedge \text{eat}(e, x, y) \wedge \text{salad}(y) \wedge \text{red}(z) \wedge \text{fork}(z) \wedge \text{involved}(z, e)$



[Klaus] [ate] [a salad] [with a red fork]

$\text{uncle}(x, i) \wedge \text{marry}(x, y) \wedge \text{friend}(y, m)$



[my uncle] [marries] [Maria's friend]

$\exists x (\text{friend}(x, m) \Rightarrow \text{sleep}(x)) \wedge \forall y \forall x ((\text{friend}(y, m) \wedge \text{friend}(z, m)) \Rightarrow (y = z))$

[Maria's friend] [is sleeping]

➤ Thematic roles

The different arguments of a verbal predicate term are referred to as its **roles (thematic roles, θ -roles, semantic roles, or participants)**

- Grammar consistently distinguishes the different roles of a more-placed verb.

John opens the door with a key.

open (x)(y)(z)

open (A)(Th)(I)

A(gent) is realised by the subject

Th(eme) by the object

I(nstrument) by an adverbial

- Is there something in common to all subjects, or to all direct or indirect objects?

- subjects may differ wrt. their θ -roles

The door_{Th} opens.

subject: Th(eme)

This key_I opens the door_{Th}.

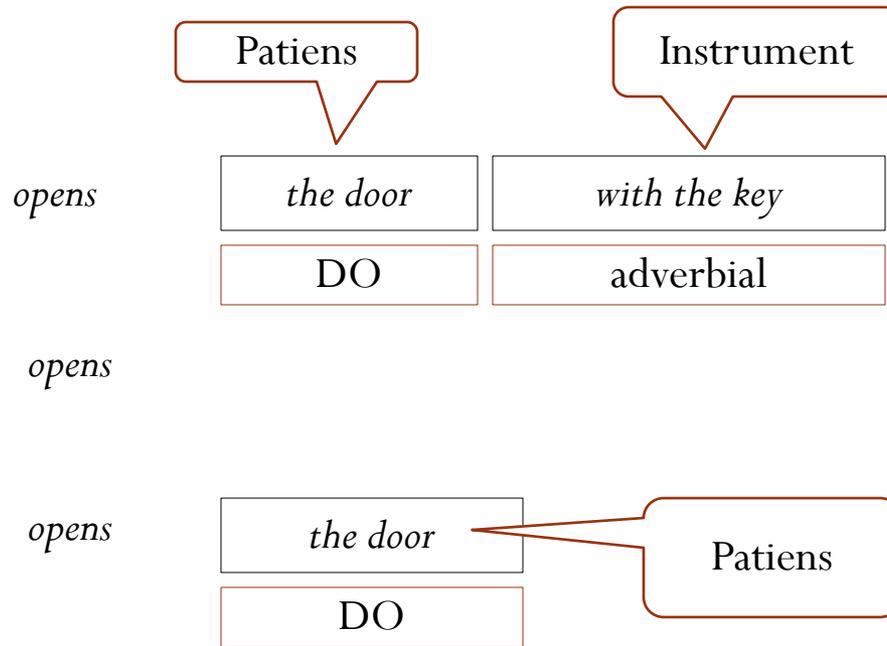
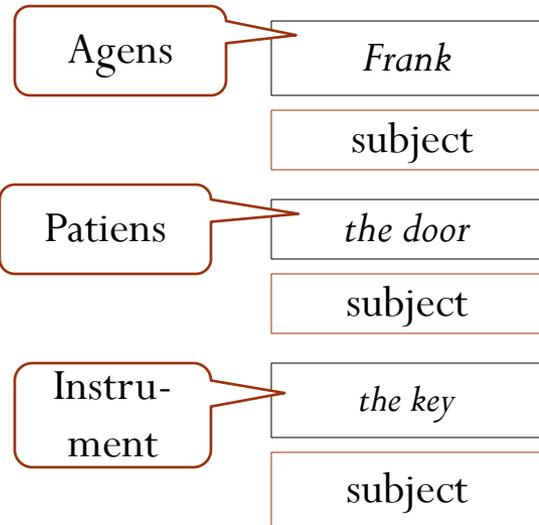
subject: I(nstrument)

The child_A opened the door_{Th}.

subject: A(gent)

The child_A opened the door_{Th} with her own key_I

subject: A



➤ Regularities

- If A is specified, it appears as the subject

The child_A opened the door_{Th}.

subject: A

- Th is always specified in the object position as long it is not the only argument term

- The child_A opened the door_{Th}.

- subject: A

- object: Th

- The door_{Th} opens.

- subject: Th

➤ Linking

The mechanism by which a language distinguishes the different arguments of predicate terms is called *linking*.

➤ Argument structure

For predicate terms, a description of their arguments in terms of roles is called *argument structure*

- The door_{Th} opens.
 - open (Th)
- This key_I opens the door_{Th}.
 - open (I, Th)
- The child_A opened the door_{Th}.
 - open (A, Th)
- The child_A opened the door_{Th} with her own key_I
 - open (A, Th, I)
- The door_{Th} was opened by the child_A
 - open (Th, A)

➤ **Argument structure and linking:** *open*

- open $x, y, (z)$
 - The child_A opened the door_{Th} with her own key_I
 - open (A, Th, I)
 - $x/A/\text{subject}$
 - $y/Th/\text{object}$
 - $z/I/\text{adverbial}$
 - The child_A opened the door_{Th}.
 - open (A, Th)
 - $x/A/\text{subject}$
 - $y/Th/\text{object}$
 - $[z/I/\emptyset]$

- open $x, y, (z)$
 - The door_{Th} opens.
 - open (Th)
 - $y/\text{Th}/\text{subject}$
 - $[x/A/\emptyset, z/I/\emptyset]$
 - This key_I opens the door_{Th}.
 - open (I, Th)
 - $z/I/\text{subject}$
 - $y/\text{Th}/\text{object}$
 - $[x/A/\emptyset]$
 - The door_{Th} was opened by the child_A
 - open-passive (Th, A)
 - $y/\text{Th}/\text{subject}$
 - $x/A/\text{adverbial}$
 - $[z/I/\emptyset]$

➤ Thematic roles

path	path of movement	<i>She rode through the desert</i>
goal	goal of a movement	<i>She put the keys on the desk</i>
agent	performs an action expressed by the verb	<i>John opened the door Bill is sleeping</i>
theme/ patient	undergoes the action/ change/event expressed by the verb	<i>John wrote a letter Mary marries him The door opens</i>
experiencer	experiences a perception, feeling or other states	<i>John saw him. The event surprised her</i>
instrument	an instrument, or a cause, by which the event comes about	<i>This key opens the door She was shaking with fear</i>
locative	a location	<i>The bottle is standing on the desk</i>

➤ **Linking strategies in English**

The subject and the DO in English sentences differ in three ways, which illustrate three general linking strategies:

- **Word order.** The subject precedes the finite verb, the DO follows it.
- **Case.** The subject is in nominative case, the object in objective case.
- **Agreement.** Agreement between subject and full verbs, or the auxiliaries *be* and *have*, respectively

➤ Selectional restrictions of verbs

- A predicative term cannot be combined with arbitrary complements
 - The cook has murdered an eggplant.
 - Th of *murder* must be a human being
 - The potatoes are frying the cook.
 - A of *fry* must be capable of acting.
- The semantic conditions on arguments are called *selectional restrictions*.

- restrictions on the theme argument of *open*
(To work out the selectional restrictions of a particular predicate term is often puzzling)

*They opened **the door** (by sliding it open)*

*They opened **the room** (by opening the door)*

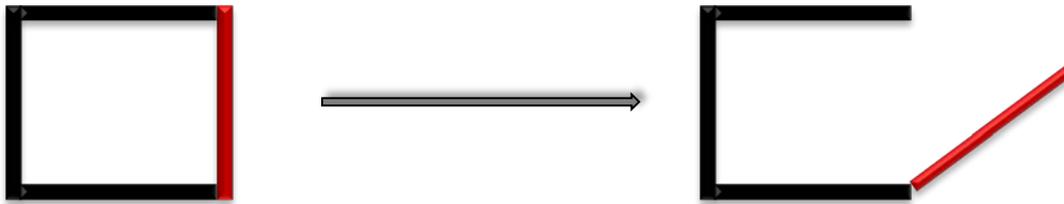
*They opened **their mouth / eyes / arms / fist***

*They opened **a letter** (by unfolding it), a book, a file*

*They opened **a bank account / business***

*They opened **perspectives***

- *to open a door / lid*
 - the **argument** (Th) that is opened is moved or removed in order to create an opening in the enclosure of a spatial region (e.g. a room or a bottle)



- *to open a bag / envelope*
 - the **argument** that is opened is the enclosure and the result of the act is an aperture in the enclosure



- *to open a room / garden / shop / my mouth*
 - the **argument** has an enclosure in which then an aperture is brought about



- *open* is multiply polysemous. In each of its meaning variants, the verb expresses a different process with respect to its theme argument and imposes different selectional restrictions.

➤ Fusion

- The combination of a predicate term with complement results in two sources of information of the argument.
 - The complement provides an explicit specification of the predicate
 - The predicate provides the information via the selectional restrictions
- These two pieces of information are conjoined when the meaning of the sentence is composed. This process is called *fusion*.

- different results of fusion:
 - The doctor himself vaccinates John.
 - The selectional restrictions are less specific than the argument specification.
 - The total description is identical to the argument specification
 - The next one vaccinates John.
 - The selectional restrictions are more specific than the argument specification.
 - The total description is identical to the selectional restrictions
 - The cook has murdered an eggplant.
 - The selectional restrictions and the argument are incompatible.
 - The total description is inconsistent.
 - is ruled out by the *Principle of Consistent Interpretation*

- Disambiguation of arguments by fusion

- She drank the coffee.

She planted coffee

- disambiguation via the selectional restrictions of *drink* and *plant*.

- She corrected her uncle.

She corrected the error.

- disambiguation by the complements.

- meaning shift induces by fusion
 - metonymical shift
 - Moscow declares the Chechen rebels defeated
 - meaning shift of the argument:

Declare demands a human agent argument. But Moscow is the name of a geographic entity. Thus the meaning of Moscow is shifted to a institution located there.
 - metaphorical shift
 - His courage evaporated.
 - meaning shift of the verb:

The literal meaning of *evaporate* requires some kind of physical substance. But the subject refers to a certain mental state. Thus the verb meaning is shifted to the more general meaning 'vanish completely' with selectional restrictions allowing this kind of argument.

➤ Exercises

- The little girl has given a book to her mother
- Peter is a teacher
- Max knows that Marie is ill
- Peter found Clara smart
- Peter saw Ann coming
- A duck is an animal follows from a duck is a bird
- Frank knows whether Ann will come
- Peter met a young women which is from Paris
- Ann promised Peter to come on Tuesday