

Curs 9-10

Reprezentarea cunoașterii.

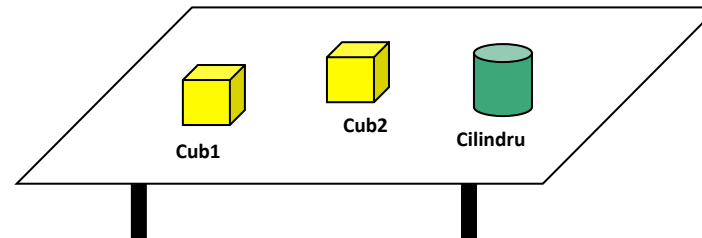
Rețele semantice

Rețele semantice descriptive

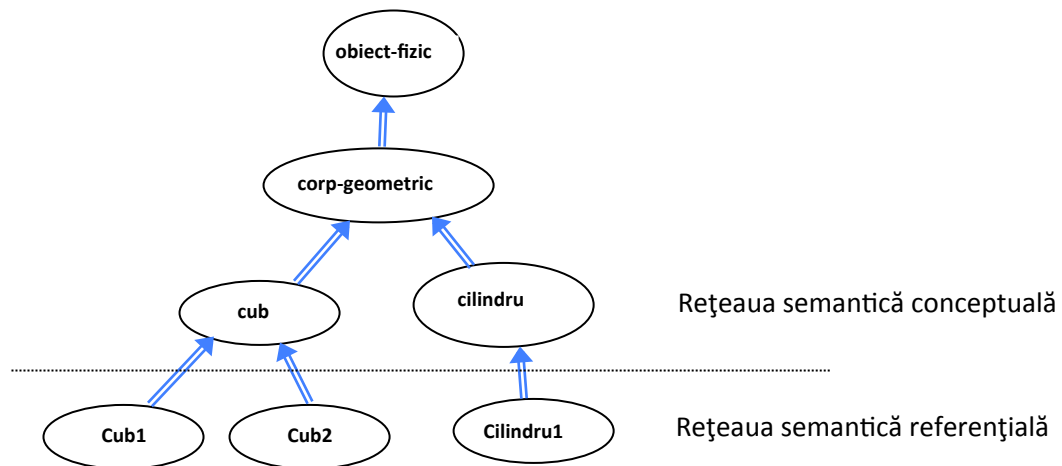
- adecvate reprezentării cunoașterii statice
- se descriu:
 - entități, în ierarhia de la general spre specific
 - relații între entități
- două niveluri:
 - conceptual (intensiv): concepte (tipuri)
 - referențial (extensiv): instanțe ale conceptelor

Rețele semantice descriptive

O lume obiectuală:



Taxonomie:



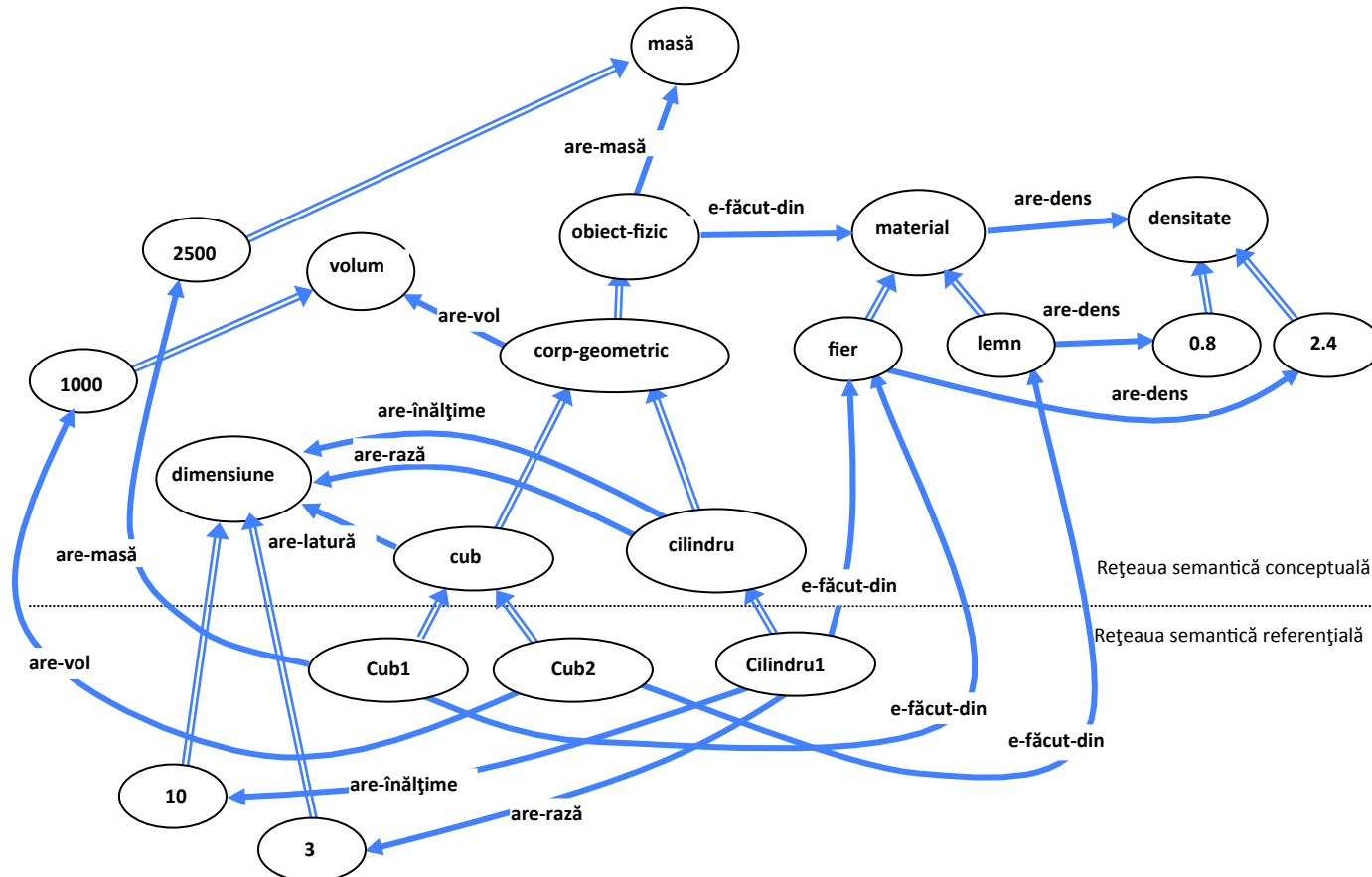
Rețelele semantice descriptive permit reprezentarea economică

- Proprietățile:
 - explicite – la nivelul conceptual
 - implicite (moștenite) – la nivelul referențial
- Interogări:
 - care este închiderea tranzitivă a relațiilor taxonomice ISA ale unui nod din rețea?
 - ce valoare este atașată prin relația semantică R nodului n ?
 - care este valoarea regăsită prin navigare în rețea în lungul lanțului de relații $R1 \dots Rn$, plecând din nodul n ?
 - care este calea de relații semantice ce se poate stabili între două noduri $n1$ și $n2$?

Interogări într-o rețea semantică

Care este densitatea corpului Cub2?

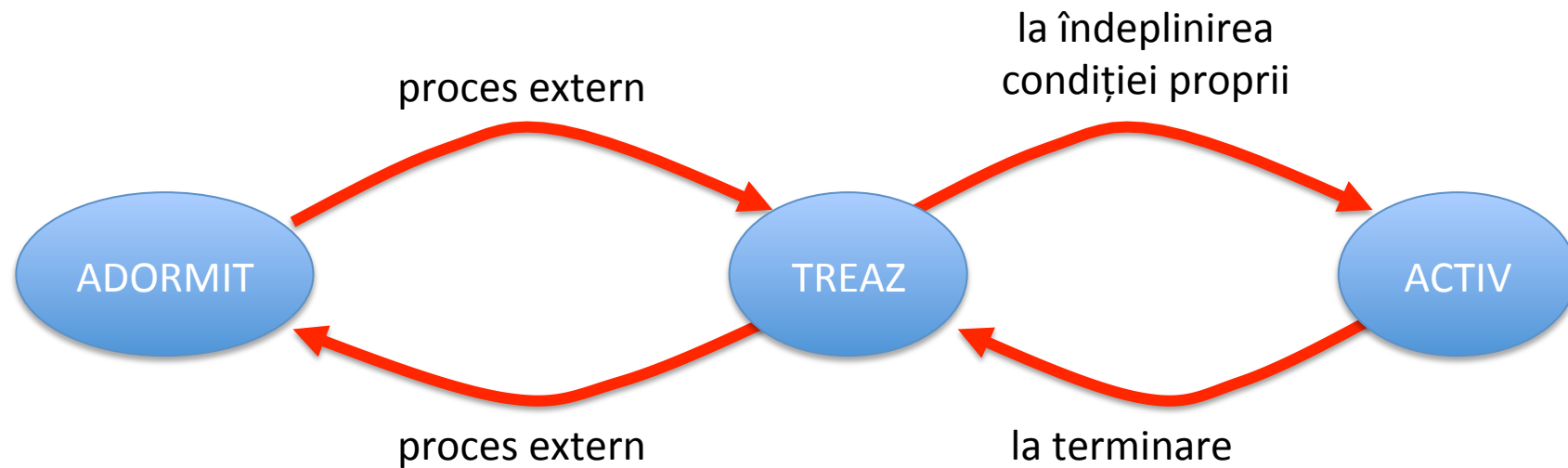
? C_{Cub2} : Cub2 ISA C_{Cub2} \rightarrow C_{Cub2} = cub
 ? R^* : cub R^* densitate \rightarrow R^* = e-făcut-din • are-dens
 ? y : Cub2 e-făcut-din • are-dens $y \rightarrow y = 0.8$



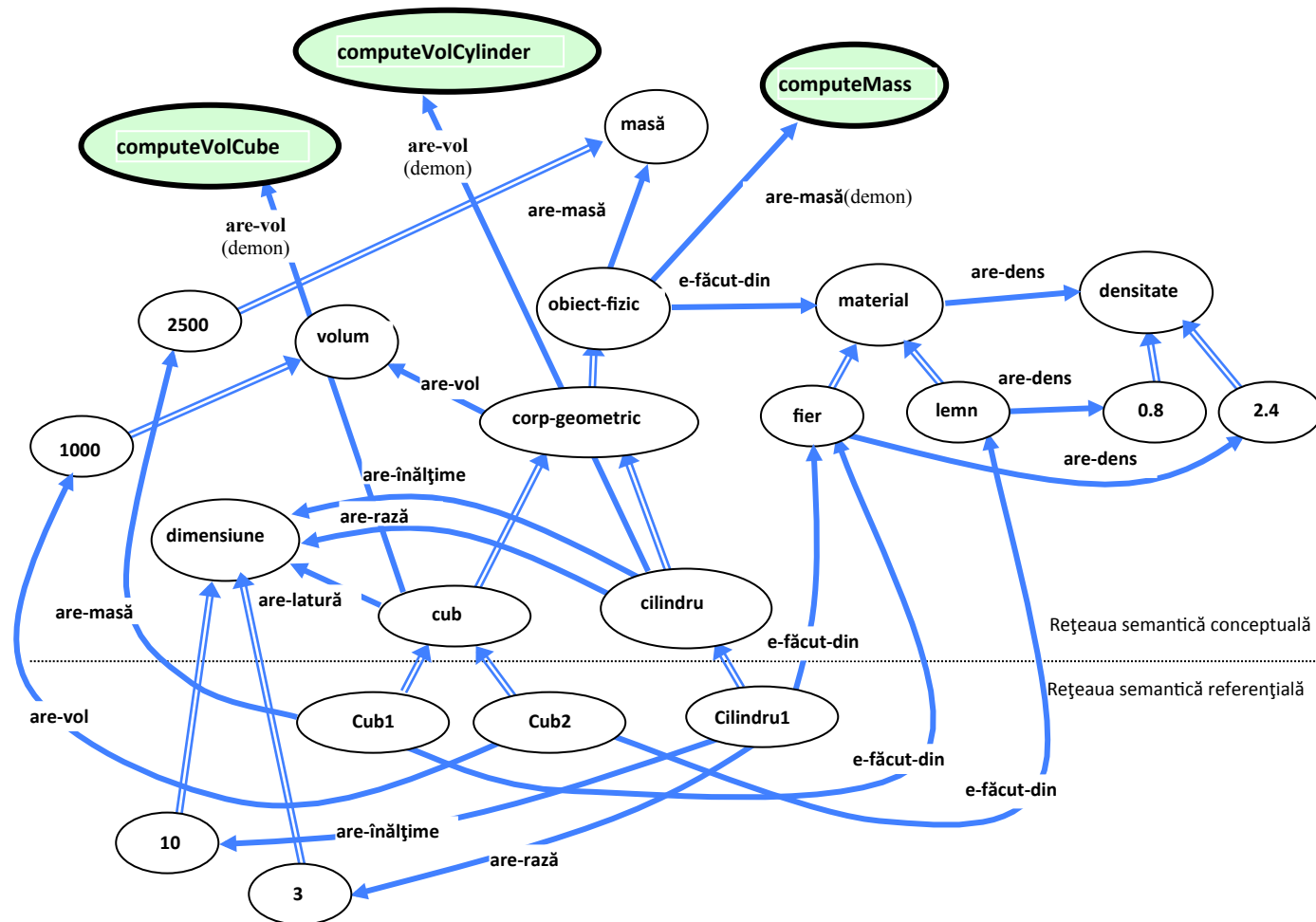
Demoni

- Proceduri care...
 - nu se apelează
 - se activează singure când anumite condiții pe care ei sunt pregătiți să le sesizeze sunt îndeplinite
- Stările unui demon:
 - **adormit**
 - **disponibil** (*idle*)
 - **activ**

Tranzițiile demonilor



Demoni într-o rețea semantică



Demonul ComputeMass

procedure ComputeMass(x)

$$m = \rho * V$$

begin

; află densitatea lui x:

?C_x: x ISA C_x

?R₁*: C_x R₁* *densitate*

?y₁: x R₁* y₁

; află volumul lui x:

?R₂*: C_x R₂* *volum*

?y₂: x R₂* y₂

; calculează masa ca *densitate* * *volum*:

return y₁ * y₂;

end

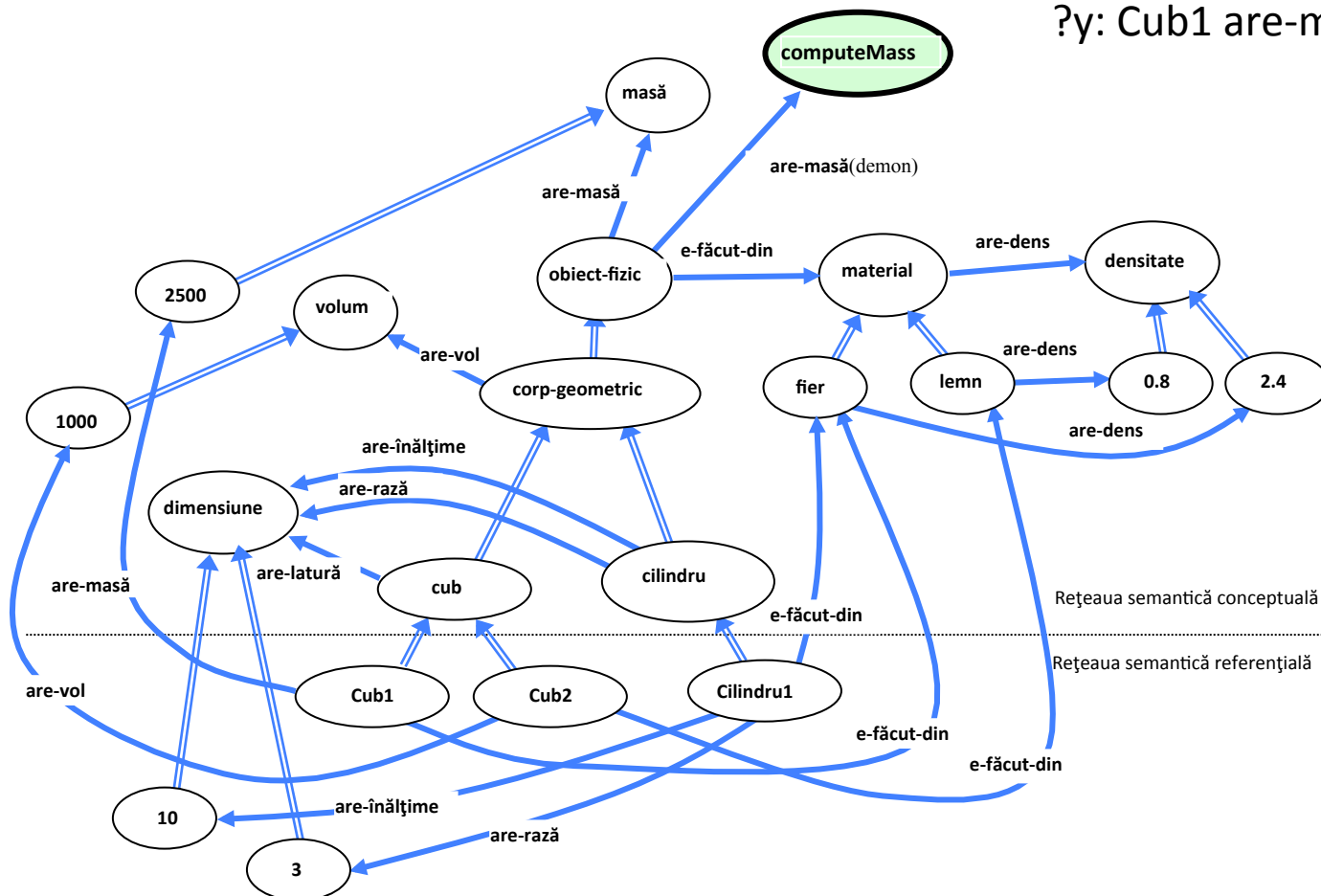
Activarea demonilor (demonul nu se activează)

Care este masa lui Cub1?

? C_{Cub1} : Cub1 ISA C_{Cub1} \rightarrow $C_{Cub1} = cub$

? R^* : cub R^* masă \rightarrow $R^* = are-masă$

? y : Cub1 are-masă y \rightarrow $y = 2500$



Demonul devine ACTIV

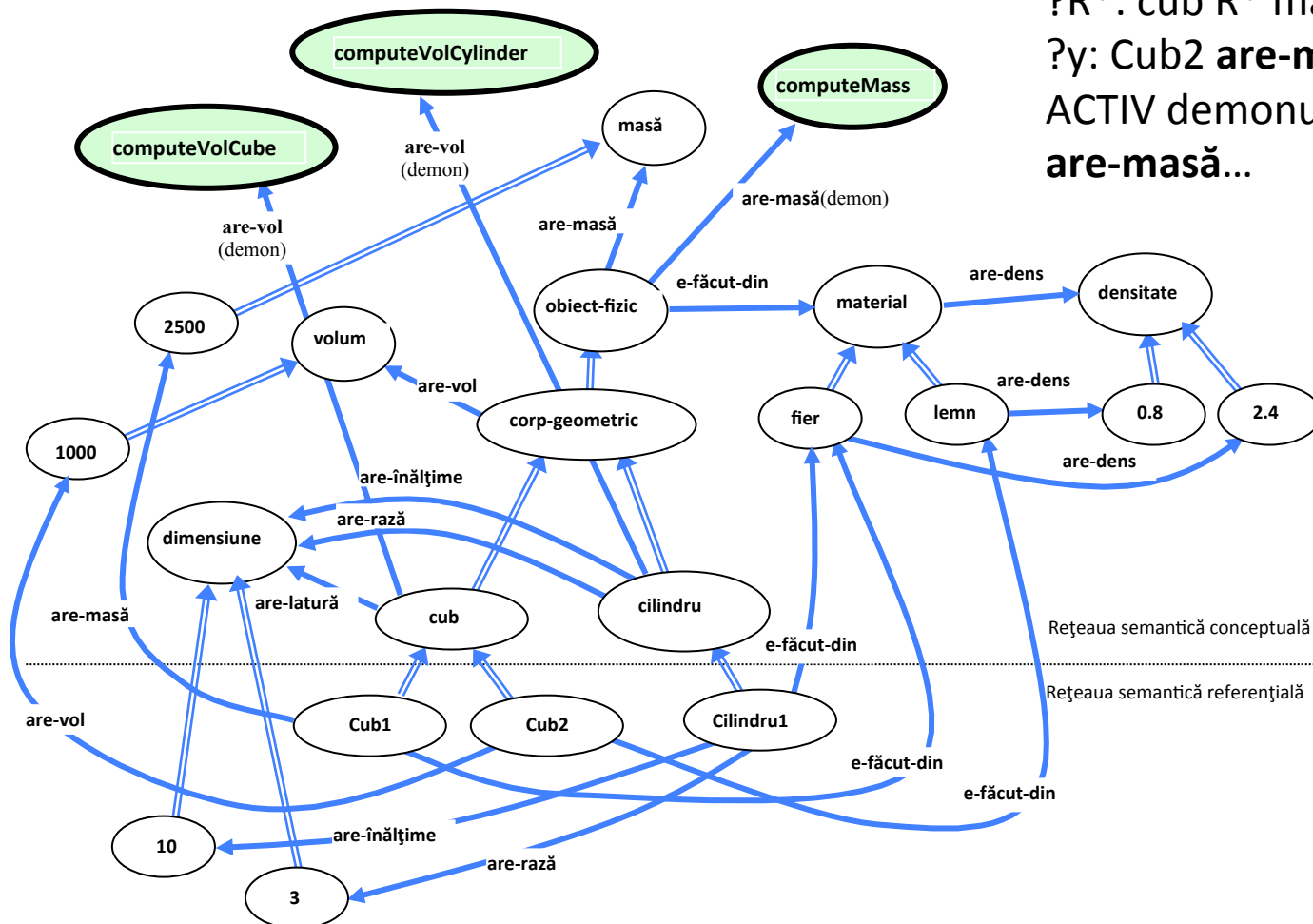
Care este masa lui Cub2?

? C_{Cub2} : Cub2 ISA $C_{Cub2} \rightarrow C_{Cub2} = cub$

? R^* : cub R^* masă $\rightarrow R^* = \text{are-masă}$

? y : Cub2 **are-masă** $y \rightarrow \text{nil} \rightarrow$

ACTIV demonul din vârful relației **are-masă...**

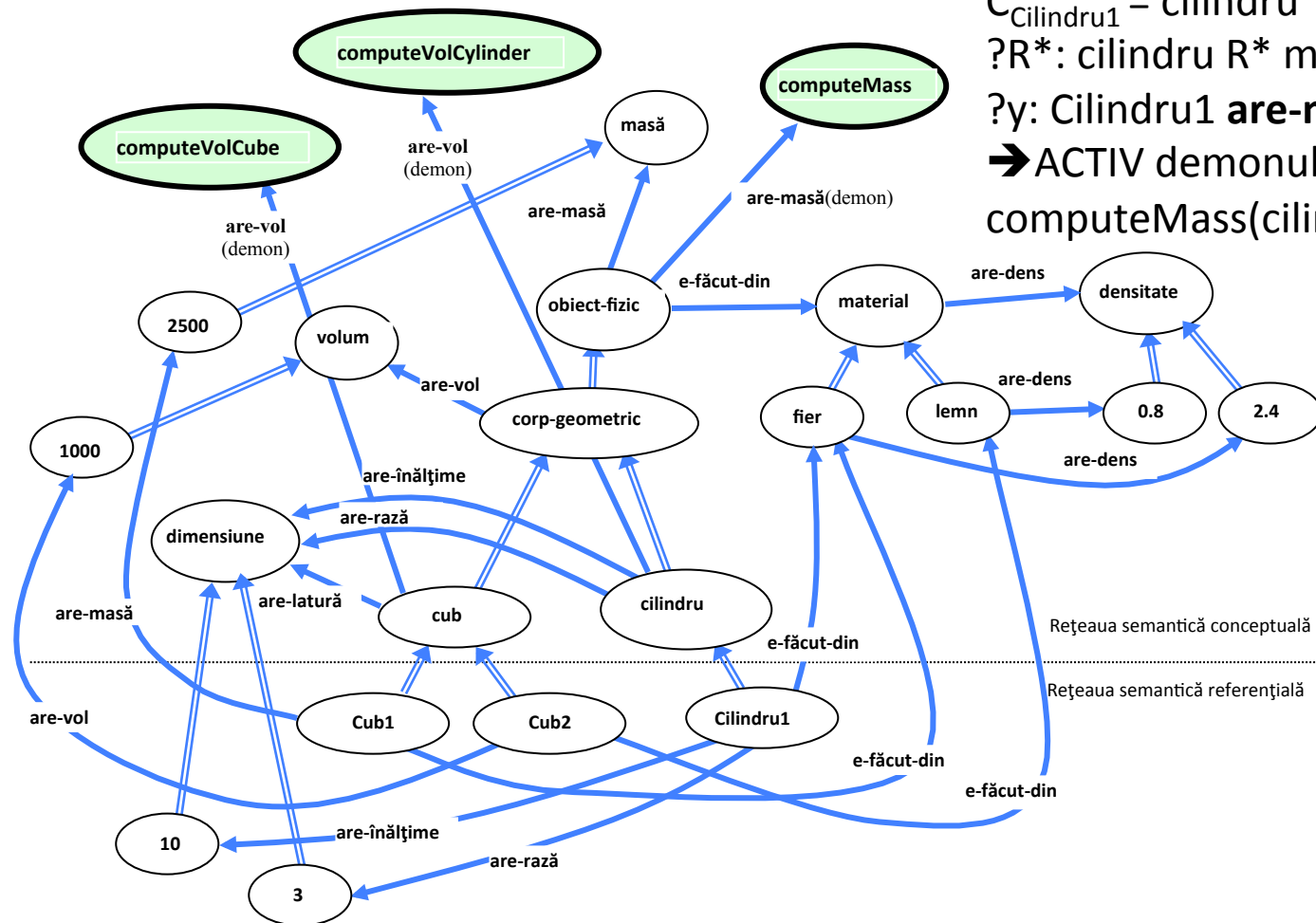


Demonul ComputeMass e activ!

procedure ComputeMass(x) cub2
begin
; află densitatea lui x:
 ?C_x: x ISA C_x → C_x = cub
 ?R₁*: C_x R₁* *densitate* → R₁* = e-făcut-din • are-dens
 ?y₁: x R₁* y₁ → y₁ = cub2 e-făcut-din • are-dens = 0.8
; află volumul lui x:
 ?R₂*: C_x R₂* *volum* → R₂* = are-vol
 ?y₂: x R₂* y₂ → y₂: cub2 are-vol y₂ → y₂ = 1000
; calculează masa ca densitate * volum:
 return y₁ * y₂; return 0.8 * 1000
end

*m = ρ * V*

Demoni într-o rețea semantică



Care este masa cilindrului 1?

? $C_{Cilindru1}$: Cilindru1 ISA $C_{Cilindru1}$ →

$C_{Cilindru1}$ = cilindru

? R^* : cilindru R^* masă → R^* = are-masă

? y : Cilindru1 are-masă y → nil

→ ACTIV demonul

`computeMass(cilindru1)`

Demonul ComputeMass e activ!

Cilindru1

procedure ComputeMass(x)

$$m = \rho * V$$

begin

; află densitatea lui x:

?C_x: x ISA C_x

→ C_x = cilindru

?R₁*: C_x R₁* densitate

→ R₁* = e-făcut-din • are-dens

?y₁: x R₁* y₁

→ y₁ = Cilindru1 e-făcut-din • are-dens =

; află volumul lui x:

2.4

?R₂*: C_x R₂* volum

→ R₂*: Cilindru R₂* volum → R₂* = are-vol

?y₂: x R₂* y₂

→ y₂: Cilindru1 are-vol y₂ → nil → ...

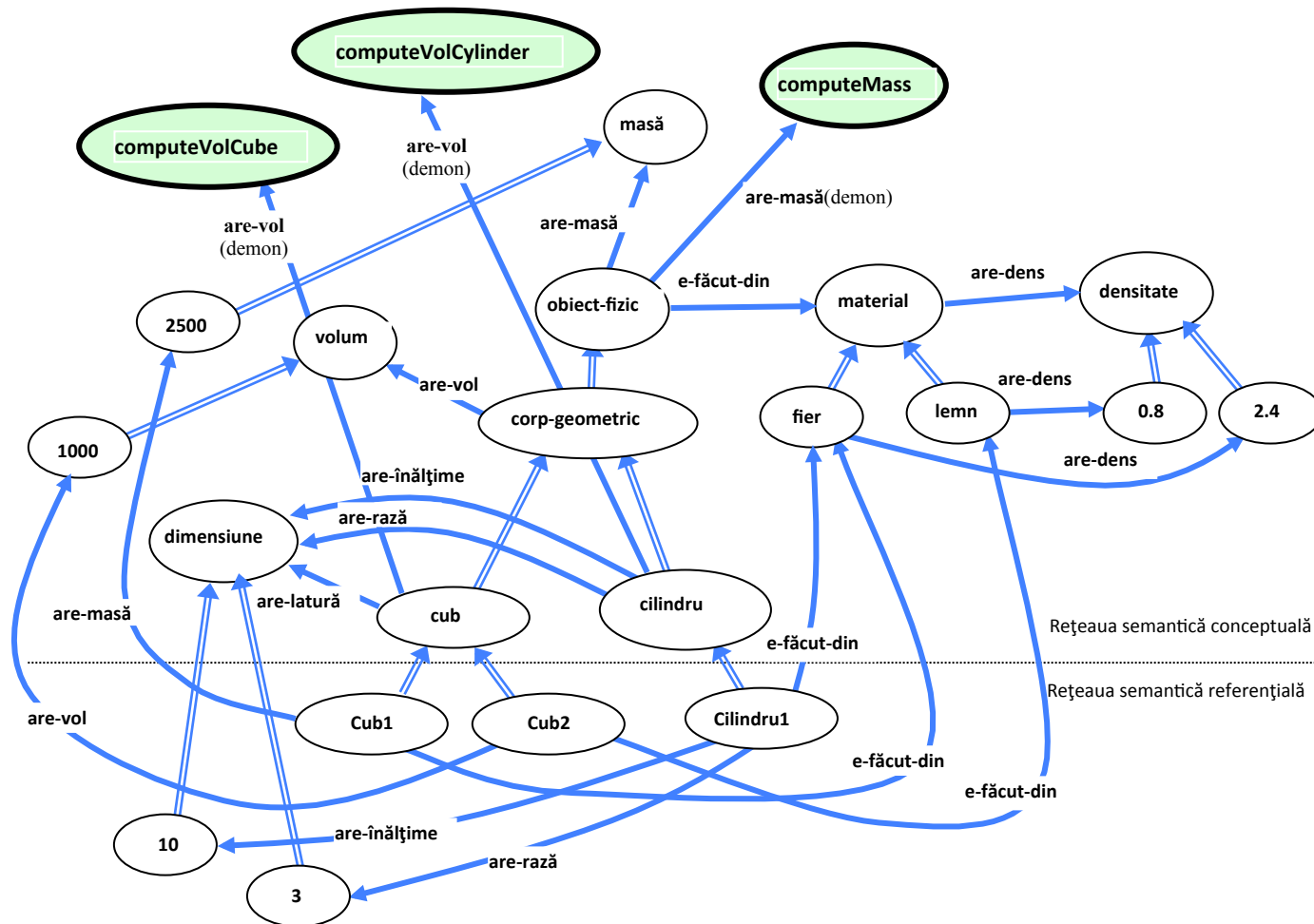
; calculează masa ca densitate * volum:

return y₁ * y₂;

return 0.8 * 1000 = 800

end

Demonul devine ACTIV



Demonul ComputeVolCylinder e activ!

$$V = \pi * r^2 * H$$

Cilindru1

- **procedure** ComputeVolCylinder(*x*)
- **begin**
- ; află raza bazei lui *x*:
- ?*r*: *x* are-rază *r* → 3
- ; află înălțimea lui *x*:
- ?*h*: *x* are-înălțime *h* → 10
- ; calculează volumul:
- **return** 3.14 * *r* * *r* * *h*; return 3.14 * 3 * 3 * 10 = 282.6
- **end**

Demonul ComputeMass e activ!

Cilindru1

```
procedure ComputeMass(x)
```

$$m = \rho * V$$

```
begin
```

```
; află densitatea lui x:
```

```
?Cx: x ISA Cx
```

→ C_x = cilindru

```
?R1*: Cx R1* densitate
```

→ R₁* = e-făcut-din • are-dens

```
?y1: x R1* y1
```

→ y₁ = Cilindru1 e-făcut-din • are-dens =

```
; află volumul lui x:
```

2.4

```
?R2*: Cx R2* volum
```

→ R₂*: Cilindru R₂* volum → R₂* = are-vol

```
?y2: x R2* y2
```

→ y₂: Cilindru1 are-vol y₂ → nil → ... 282.6

```
; calculează masa ca densitate * volum:
```

```
return y1 * y2;
```

return 2.4 * 282.6 = 678.24

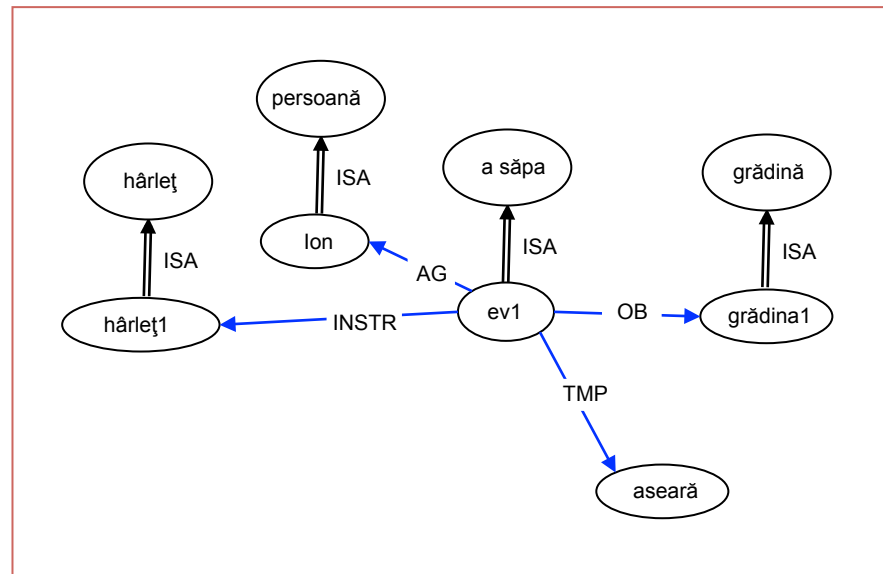
```
end
```

Rețele semantice evenimentțiale

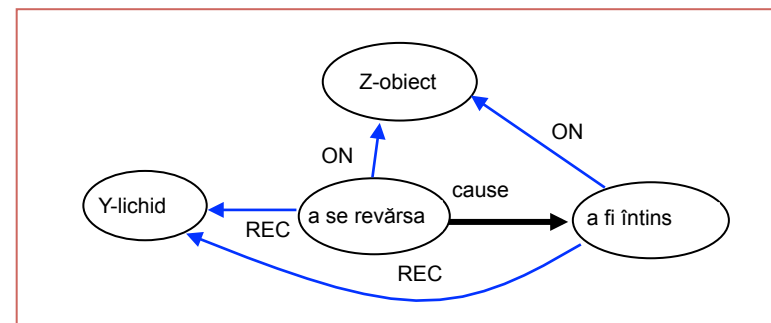
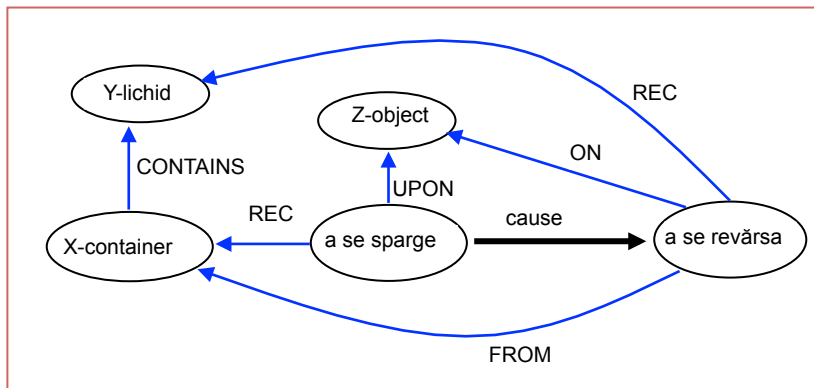
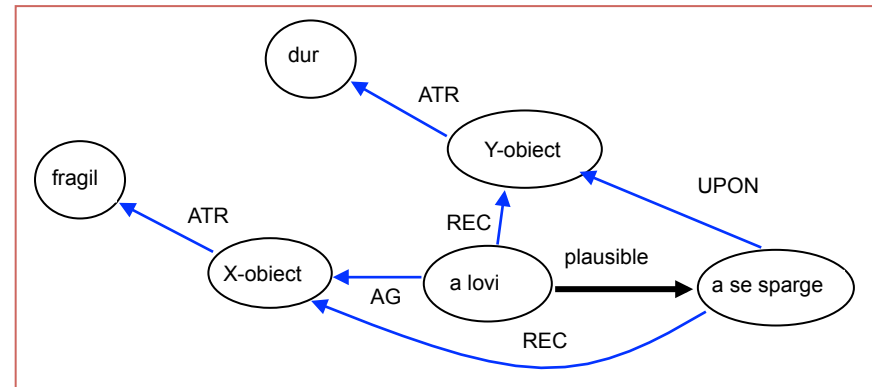
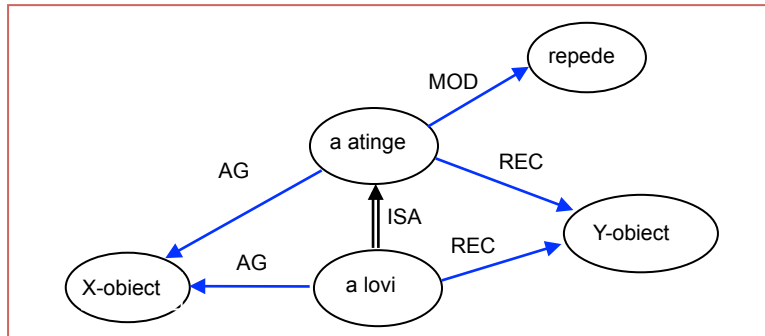
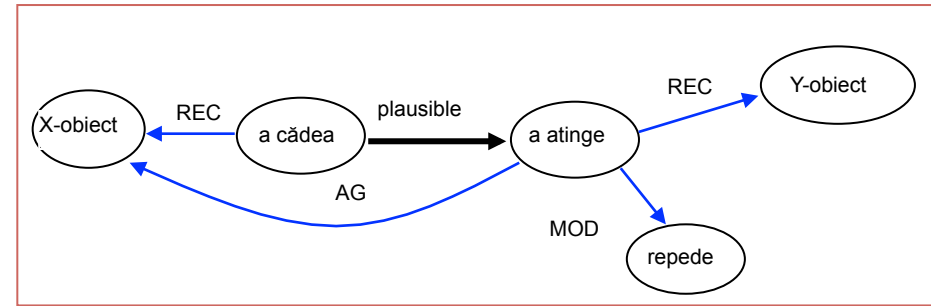
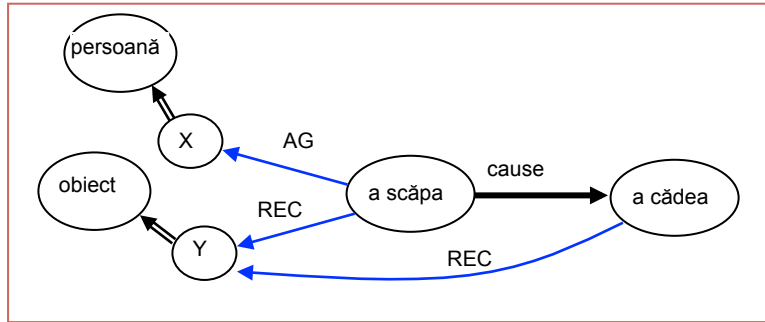
- adecvate reprezentării cunoașterii dinamice
- se descriu:
 - entități și tipuri
 - evenimente în care sunt angrenate entitățile
 - reguli de bun-simț
 - secvențe de evenimente
- pot fi folosite la:
 - explicarea semnificației unor enunțuri
 - generarea de situații specifice pentru verificarea unor condiții
 - simularea comportamentului unor societăți de agenți

Reprezentări evenimențiale

Ion a săpat aseară gradina cu hârlețul.

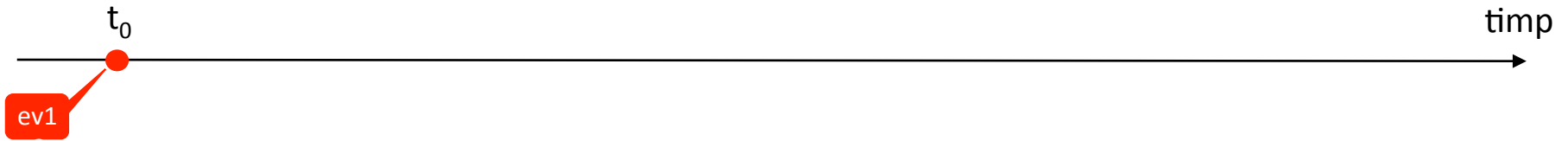


Reguli de modelare a lumii reale

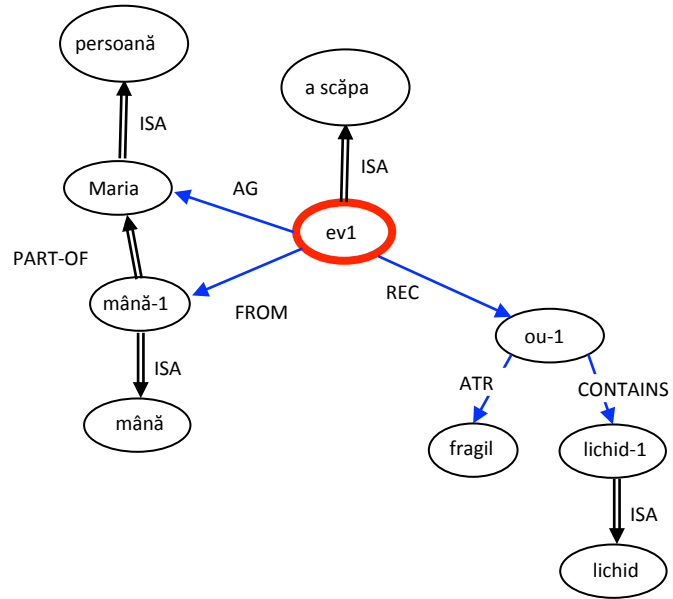


Care sunt procesele care se dezvoltă în
mintea noastră când citim un text?

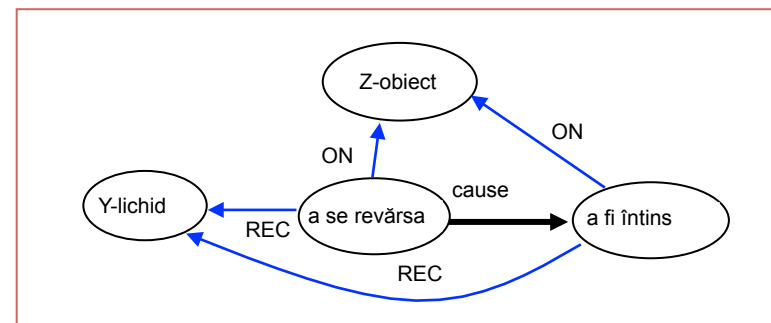
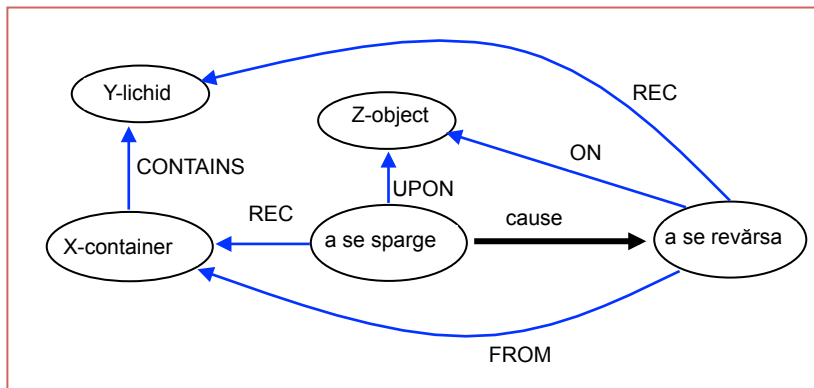
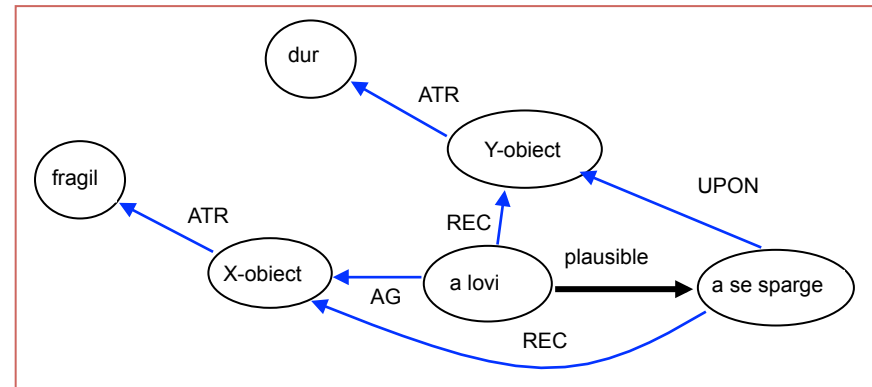
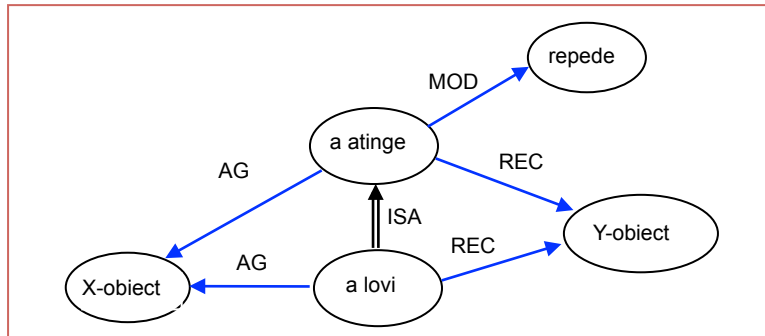
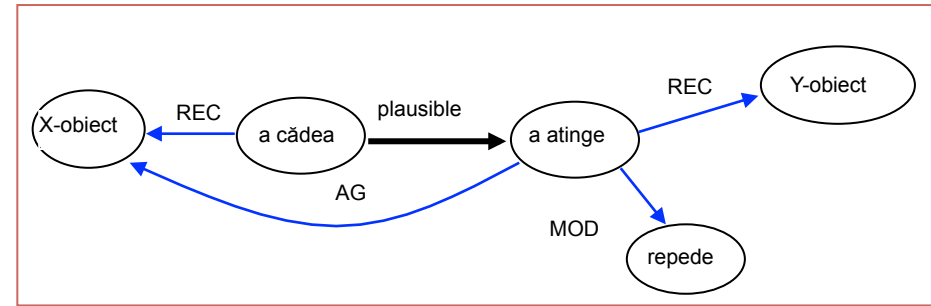
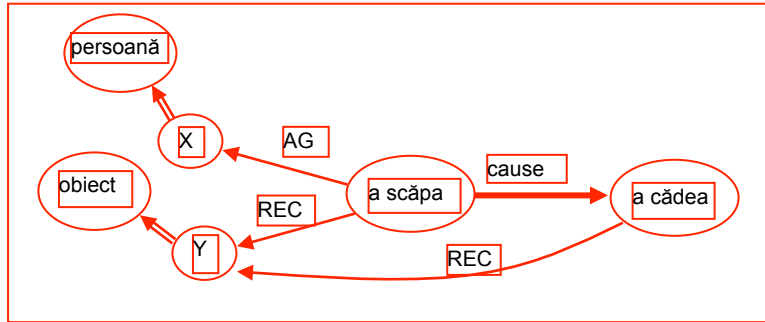
*Maria a scăpat oul din mână.
Ea a curățat apoi pardoseala.*

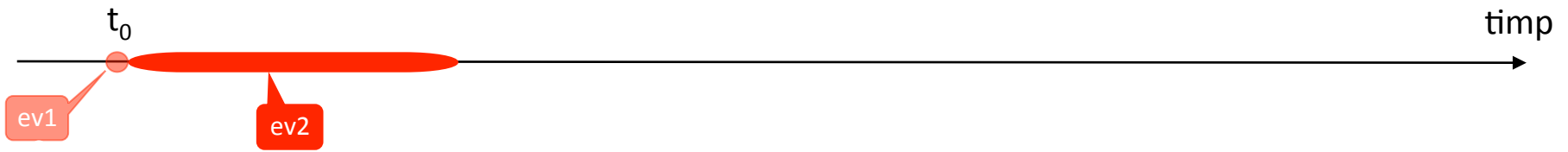


1. *Maria a scăpat oul din mână.*

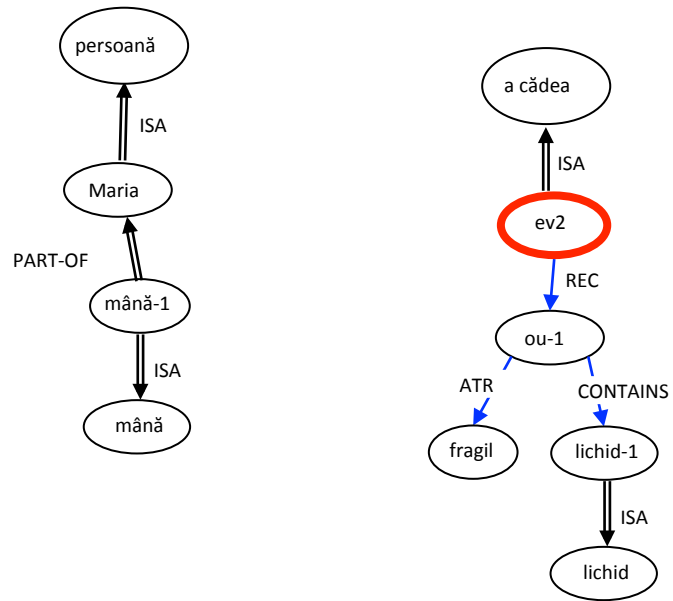


Reguli de modelare a lumii reale

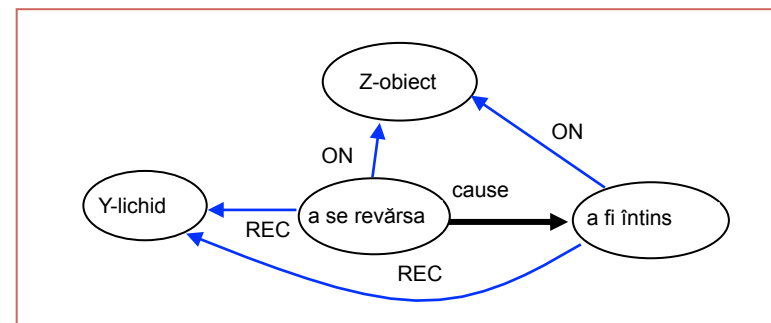
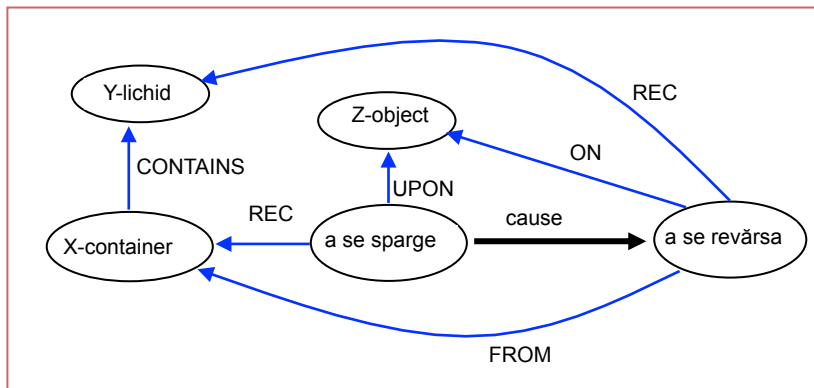
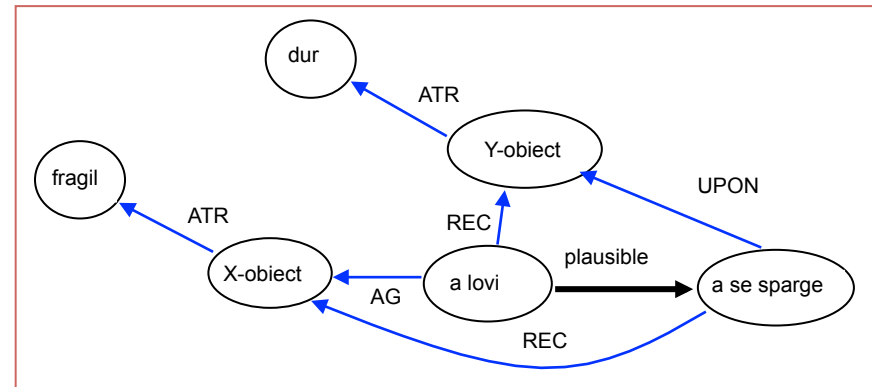
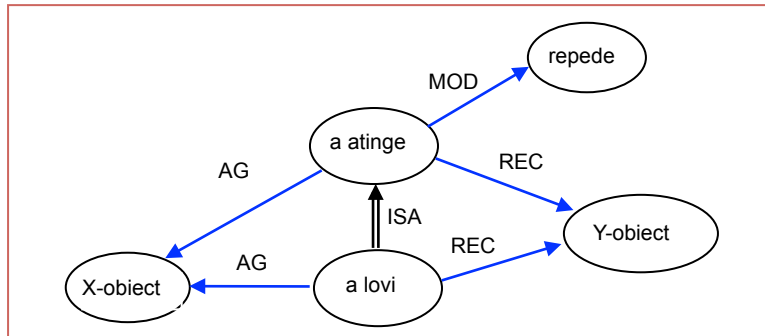
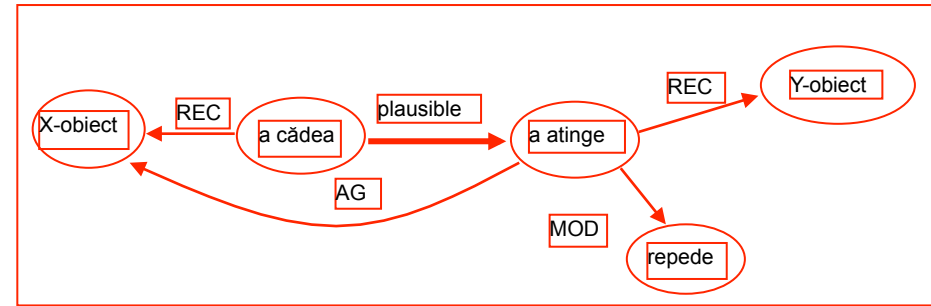
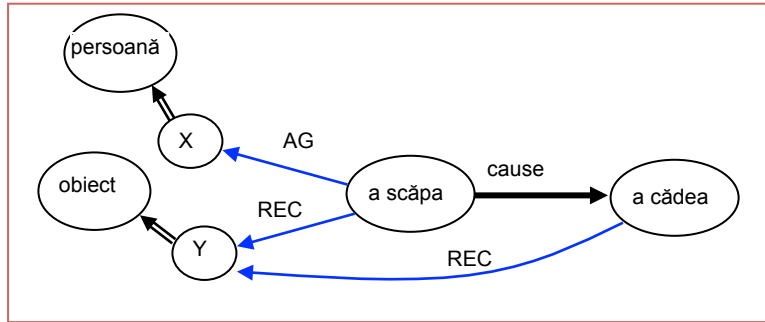


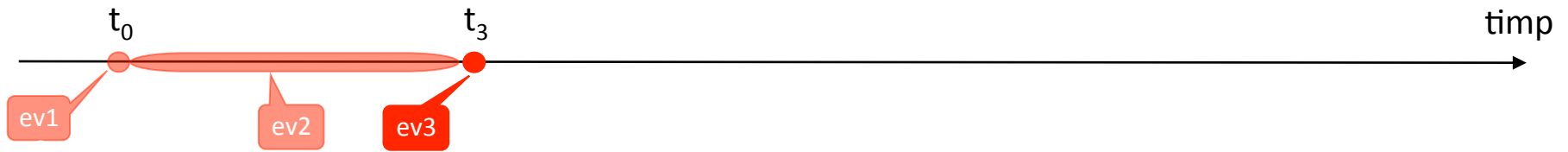


1. *Maria a scăpat oul din mână.*

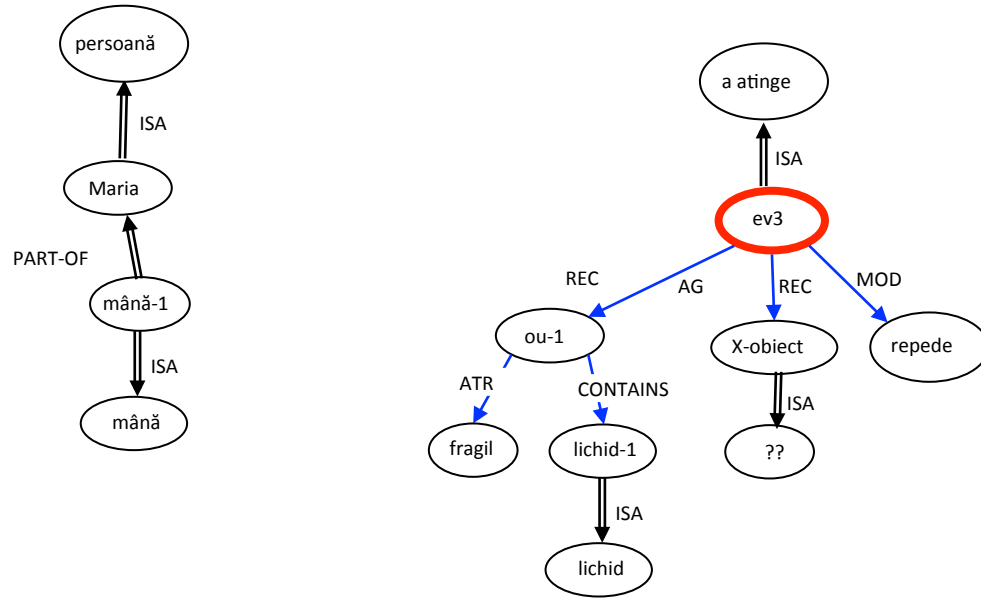


Reguli de modelare a lumii reale

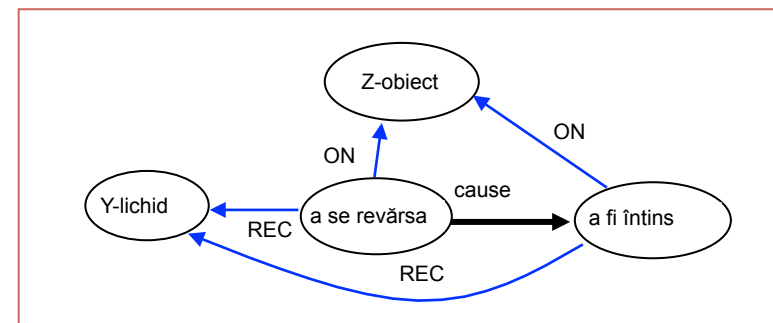
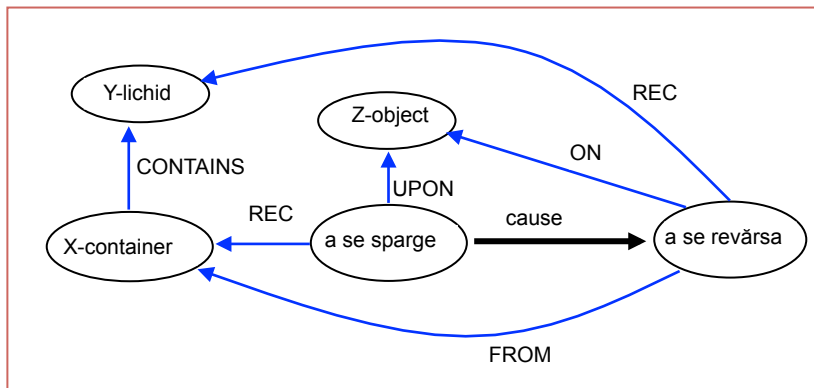
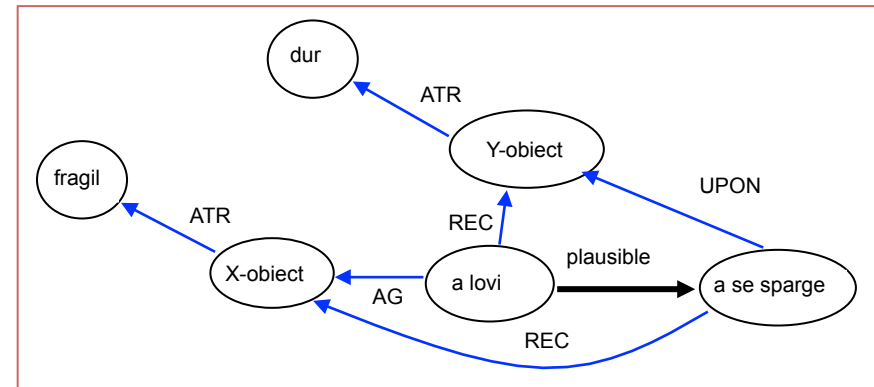
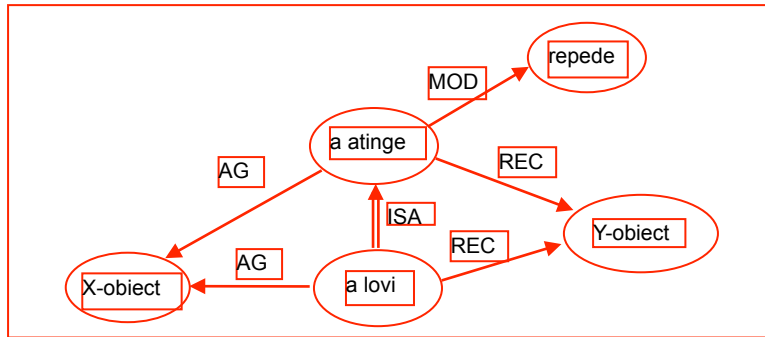
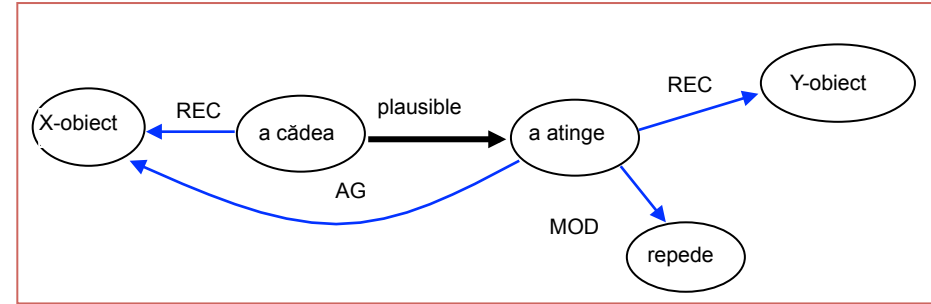
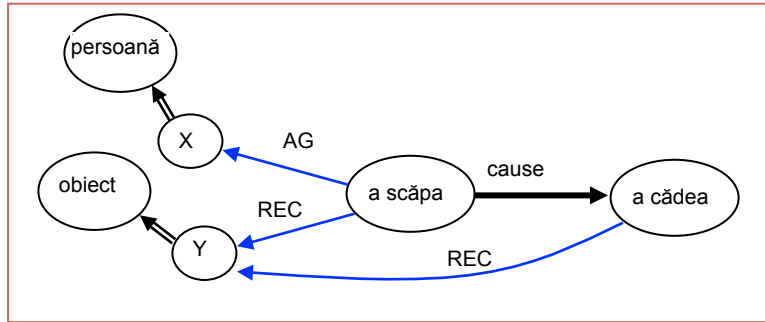




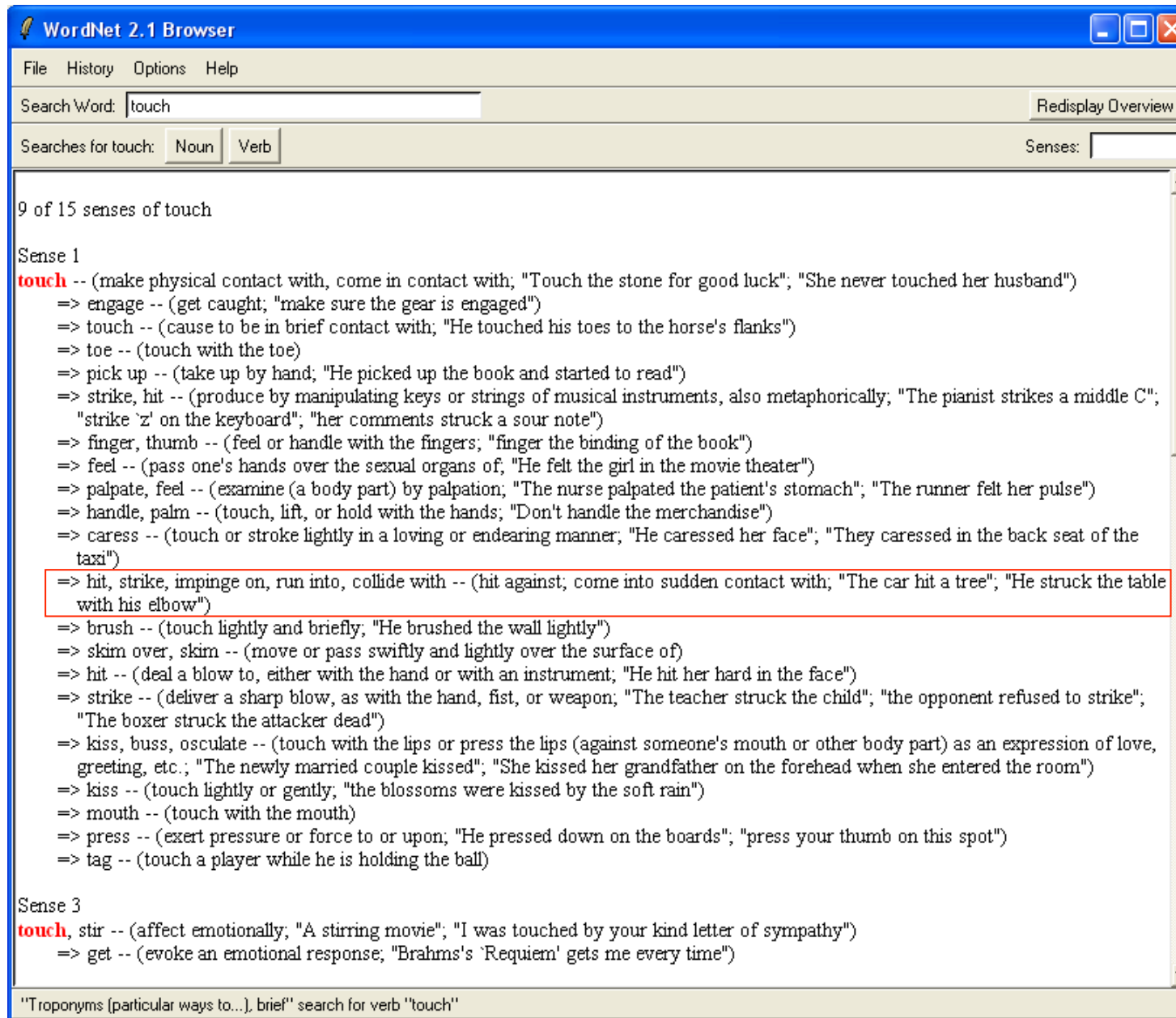
1. *Maria a scăpat oul din mână.*



Reguli de modelare a lumii reale



Wordnet ca sursă de cunoaștere



WordNet 2.1 Browser

File History Options Help

Search Word: touch Redisplay Overview

Searches for touch: Noun Verb Senses:

9 of 15 senses of touch

Sense 1

touch -- (make physical contact with, come in contact with; "Touch the stone for good luck"; "She never touched her husband")

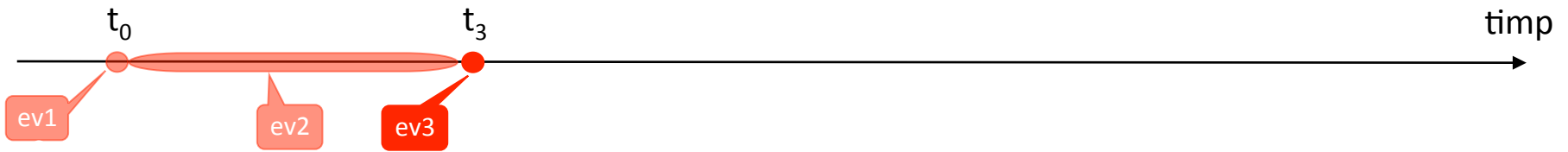
- => engage -- (get caught; "make sure the gear is engaged")
- => touch -- (cause to be in brief contact with; "He touched his toes to the horse's flanks")
- => toe -- (touch with the toe)
- => pick up -- (take up by hand; "He picked up the book and started to read")
- => strike, hit -- (produce by manipulating keys or strings of musical instruments, also metaphorically; "The pianist strikes a middle C"; "strike 'z' on the keyboard"; "her comments struck a sour note")
- => finger, thumb -- (feel or handle with the fingers; "finger the binding of the book")
- => feel -- (pass one's hands over the sexual organs of; "He felt the girl in the movie theater")
- => palpate, feel -- (examine (a body part) by palpation; "The nurse palpated the patient's stomach"; "The runner felt her pulse")
- => handle, palm -- (touch, lift, or hold with the hands; "Don't handle the merchandise")
- => caress -- (touch or stroke lightly in a loving or endearing manner; "He caressed her face"; "They caressed in the back seat of the taxi")
- => hit, strike, impinge on, run into, collide with -- (hit against; come into sudden contact with; "The car hit a tree"; "He struck the table with his elbow")
- => brush -- (touch lightly and briefly; "He brushed the wall lightly")
- => skim over, skim -- (move or pass swiftly and lightly over the surface of)
- => hit -- (deal a blow to, either with the hand or with an instrument; "He hit her hard in the face")
- => strike -- (deliver a sharp blow, as with the hand, fist, or weapon; "The teacher struck the child"; "the opponent refused to strike"; "The boxer struck the attacker dead")
- => kiss, buss, osculate -- (touch with the lips or press the lips (against someone's mouth or other body part) as an expression of love, greeting, etc.; "The newly married couple kissed"; "She kissed her grandfather on the forehead when she entered the room")
- => kiss -- (touch lightly or gently; "the blossoms were kissed by the soft rain")
- => mouth -- (touch with the mouth)
- => press -- (exert pressure or force to or upon; "He pressed down on the boards"; "press your thumb on this spot")
- => tag -- (touch a player while he is holding the ball)

Sense 3

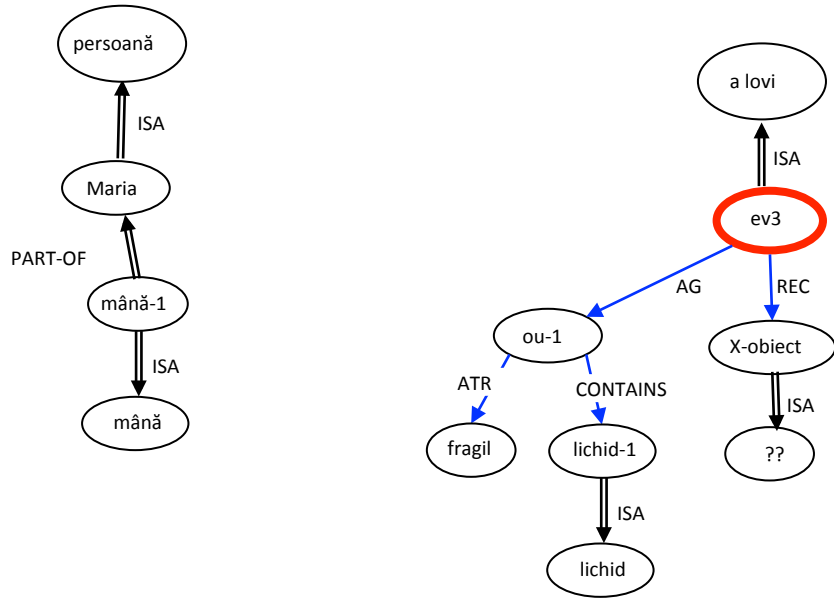
touch, stir -- (affect emotionally; "A stirring movie"; "I was touched by your kind letter of sympathy")

- => get -- (evoke an emotional response; "Brahms's 'Requiem' gets me every time")

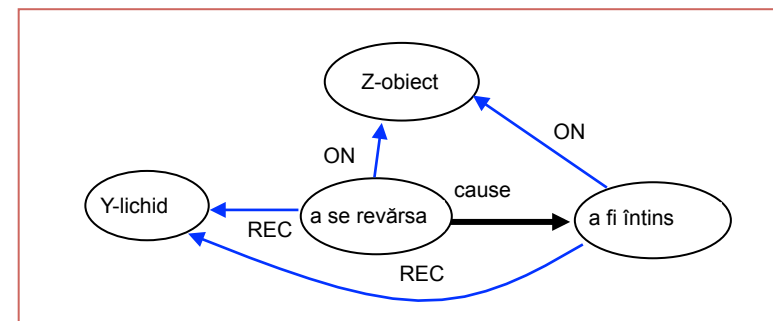
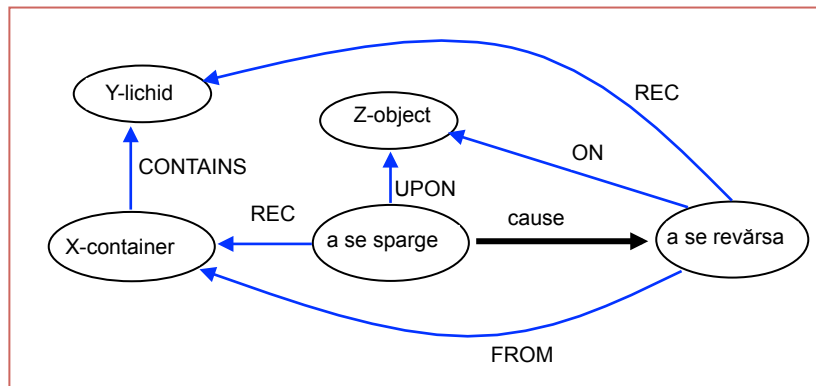
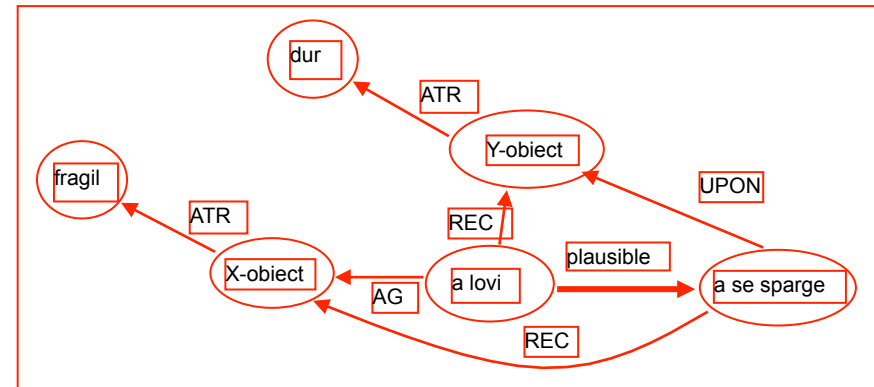
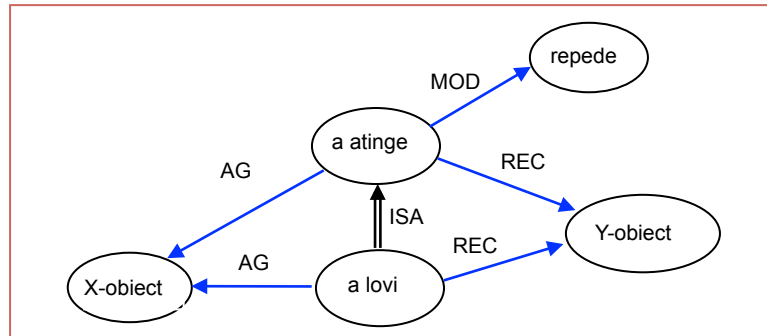
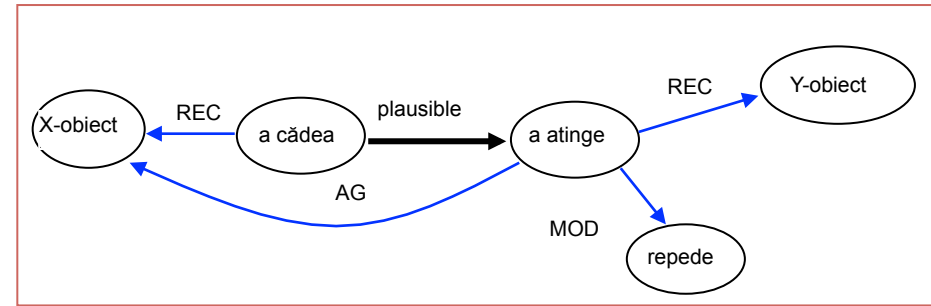
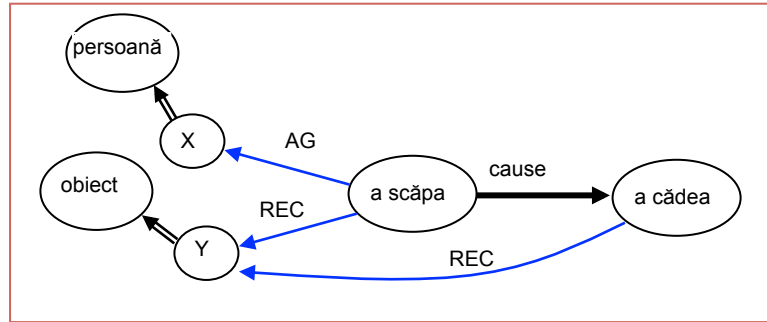
"Troponyms (particular ways to...), brief" search for verb "touch"

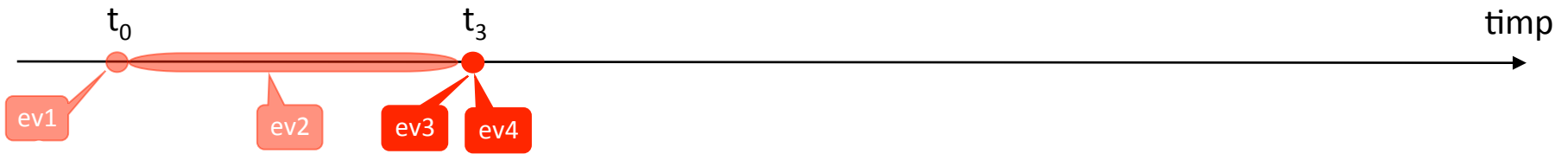


1. *Maria a scăpat oul din mână.*

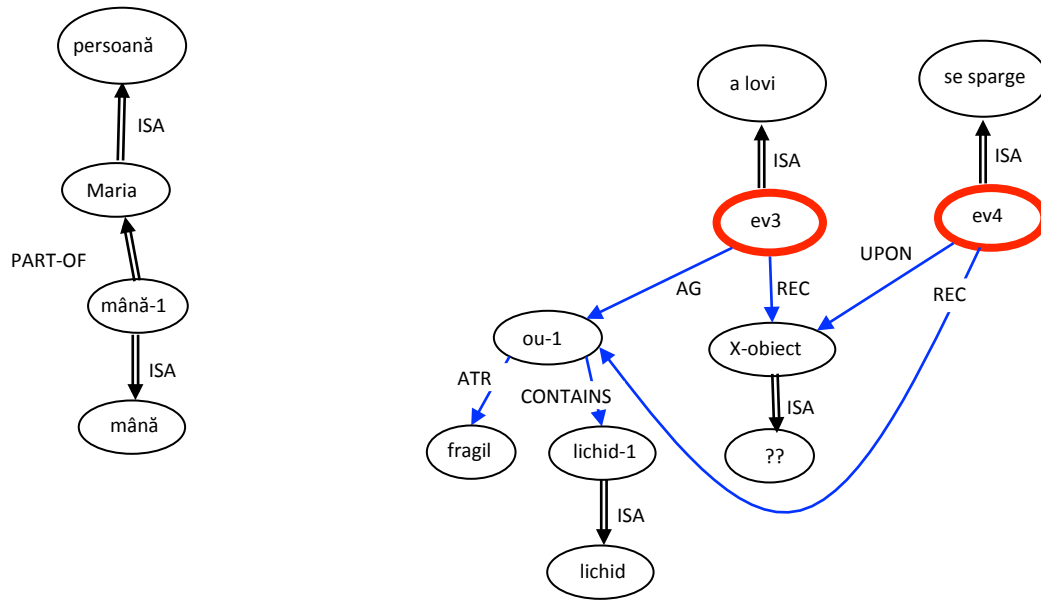


Reguli de modelare a lumii reale

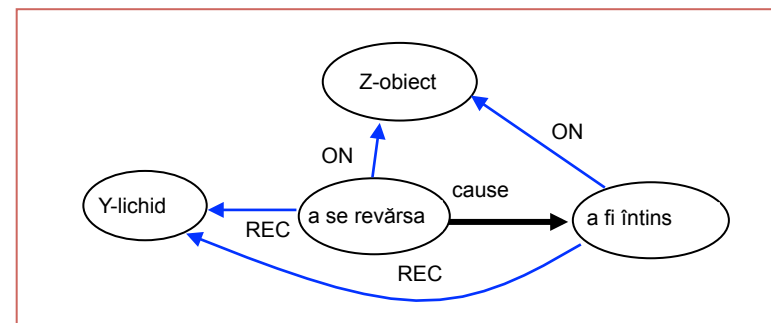
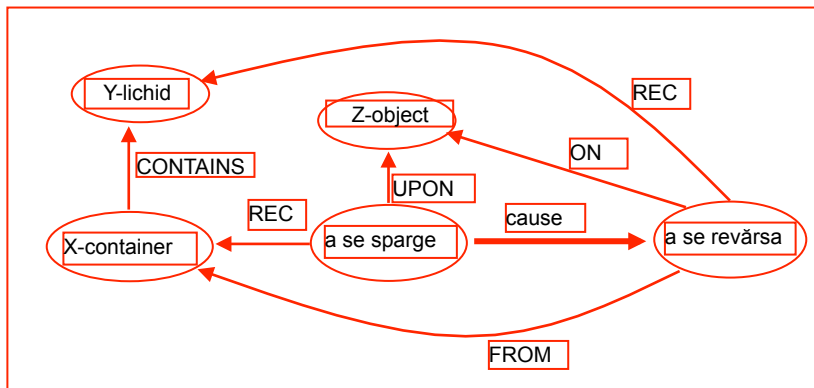
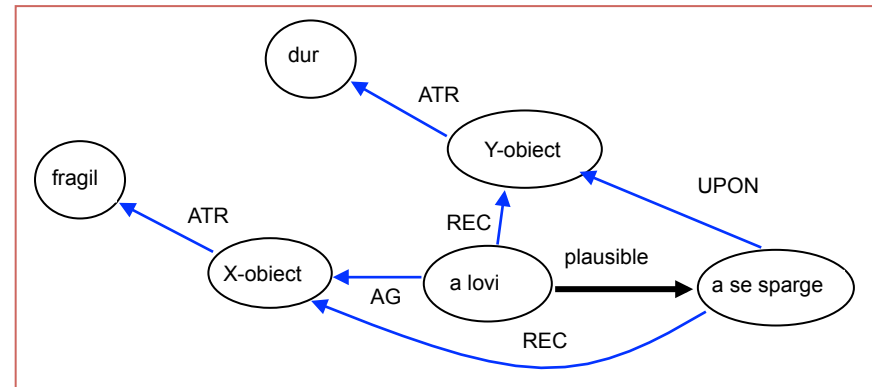
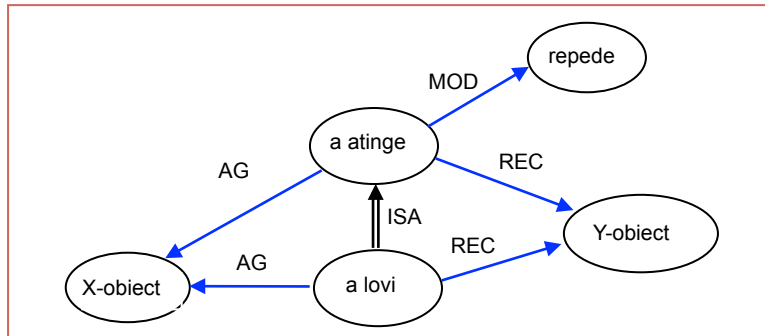
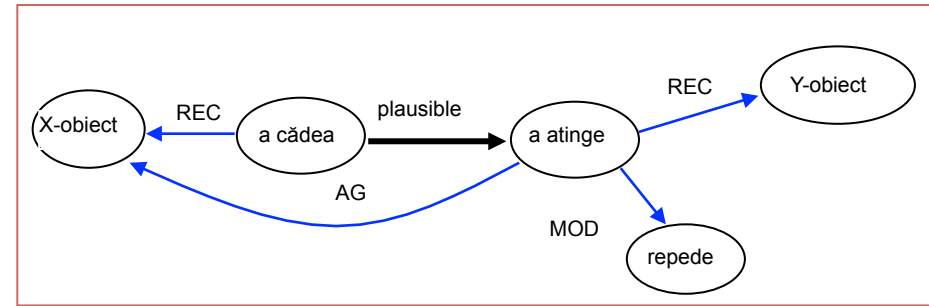
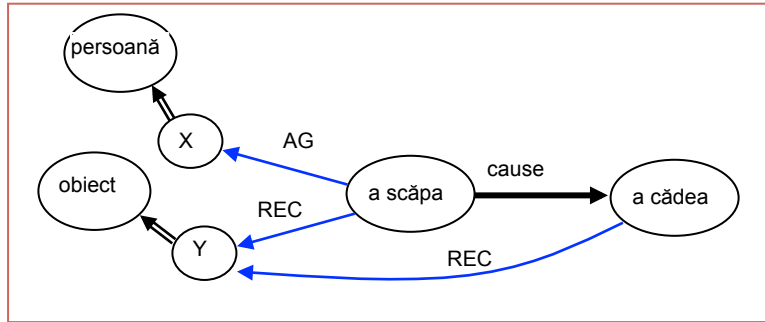




1. *Maria a scăpat oul din mână.*

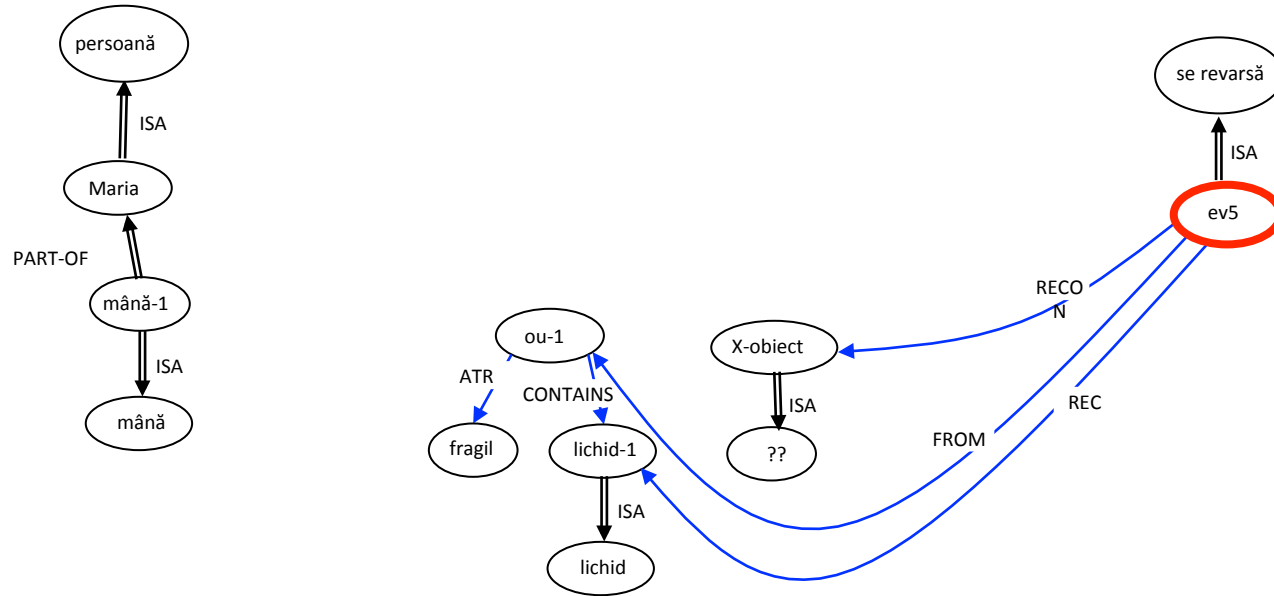


Reguli de modelare a lumii reale

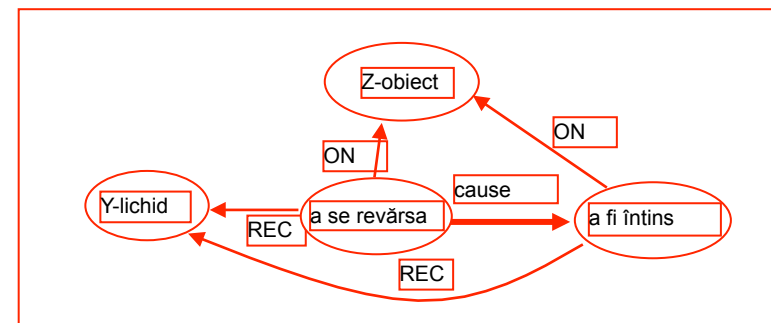
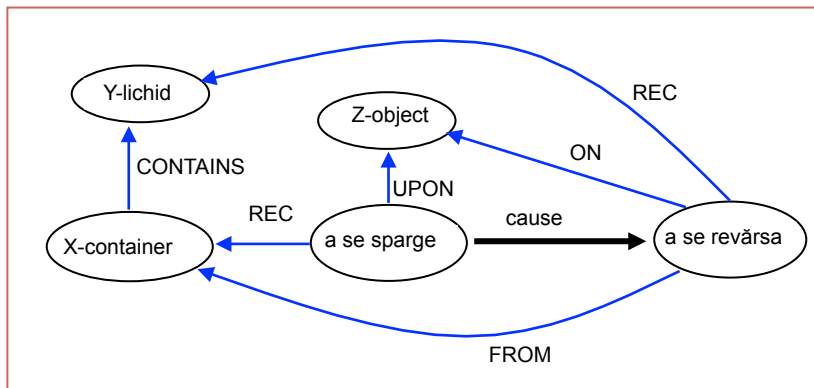
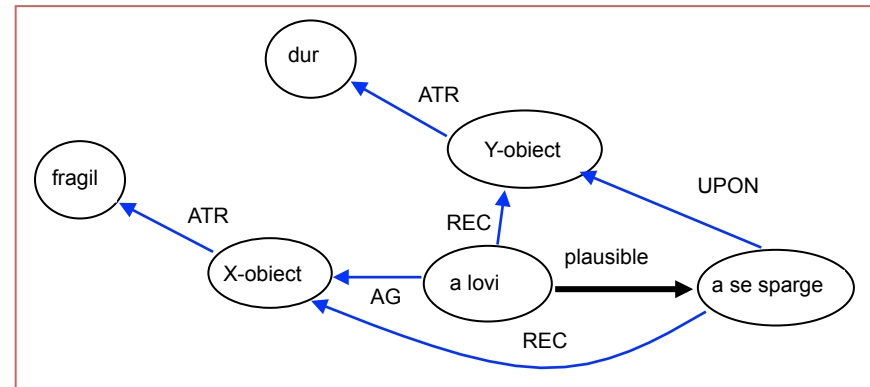
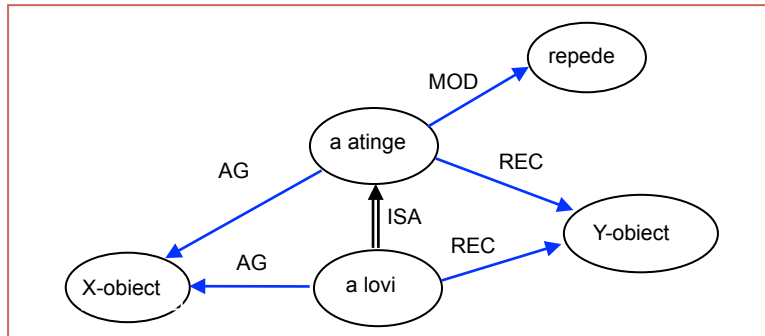
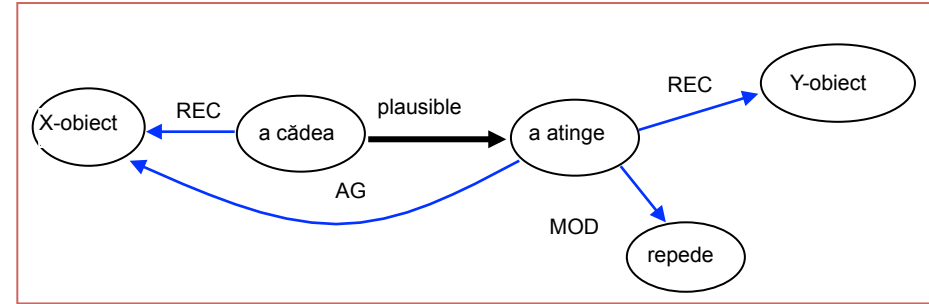
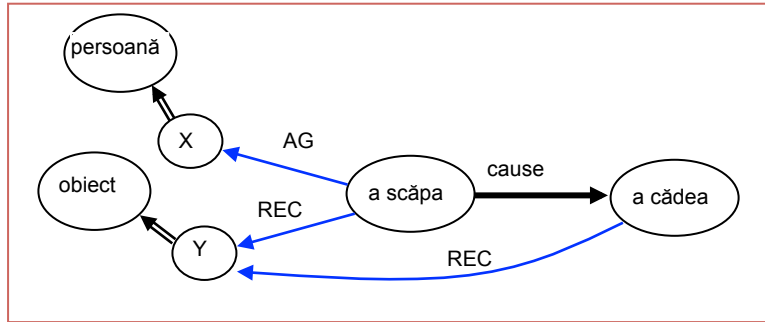




1. *Maria a scăpat oul din mână.*

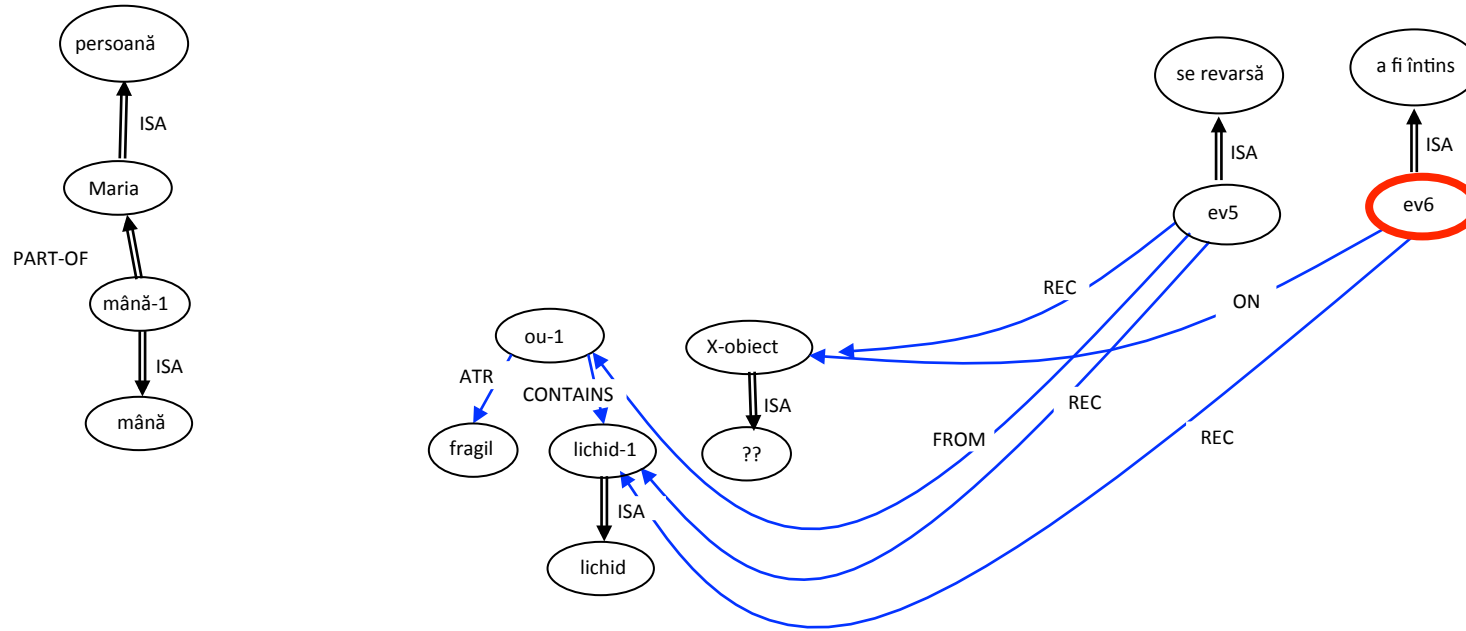


Reguli de modelare a lumii reale

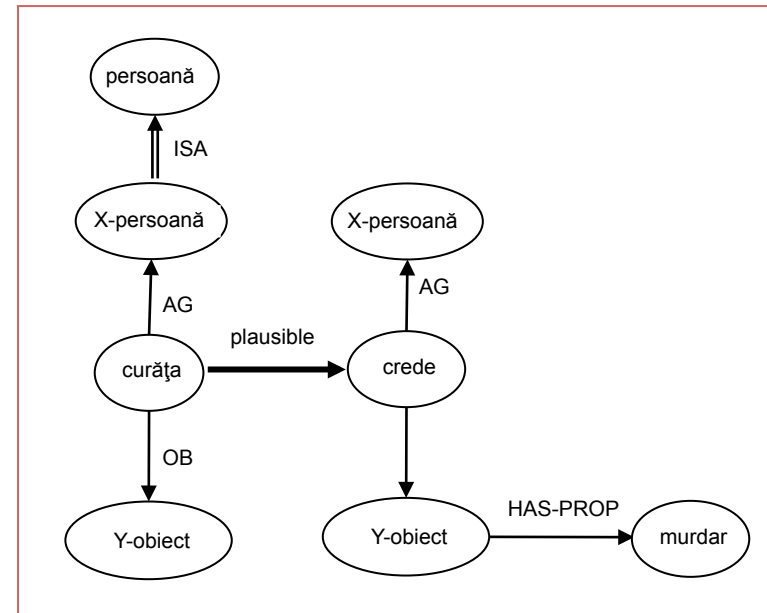
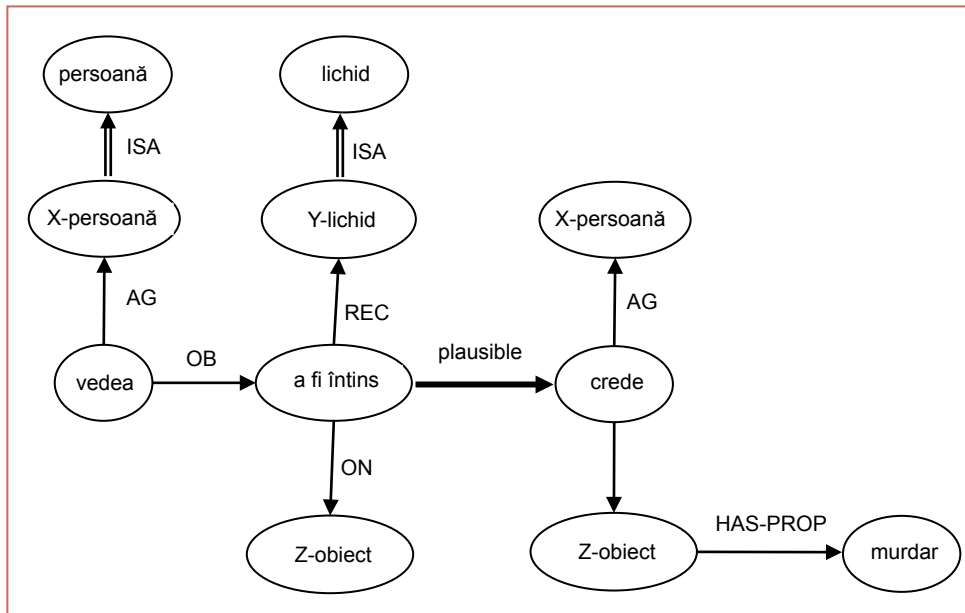




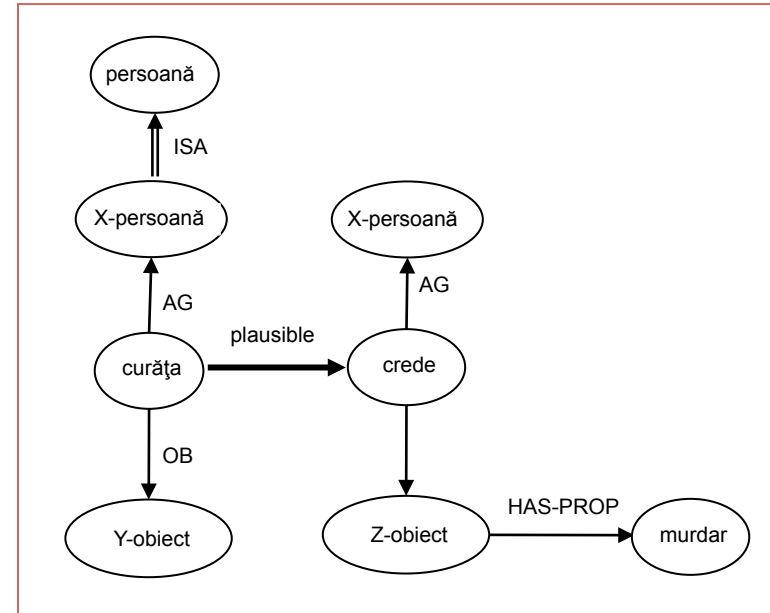
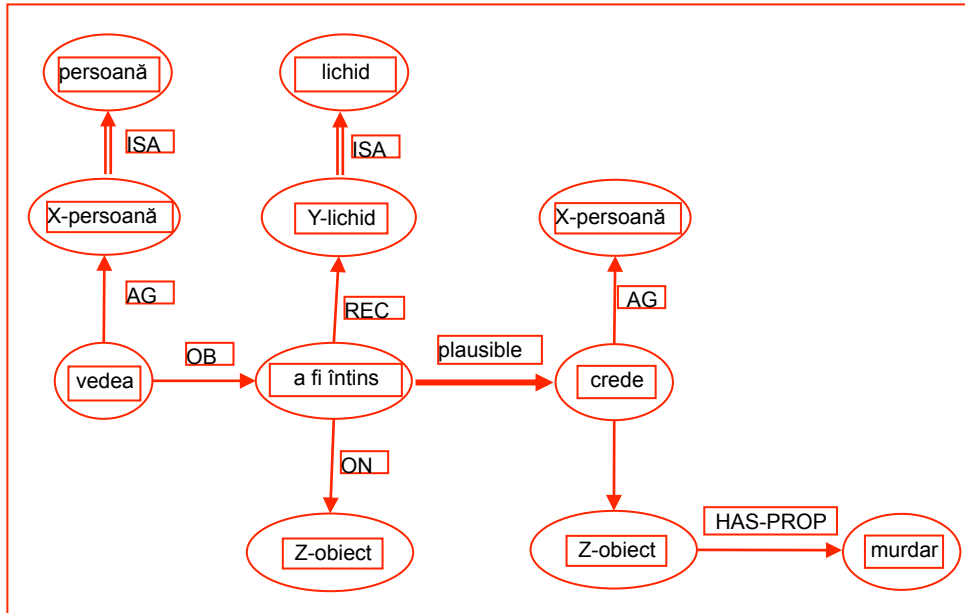
1. *Maria a scăpat oul din mână.*



Reguli de modelare a proceselor cognitive

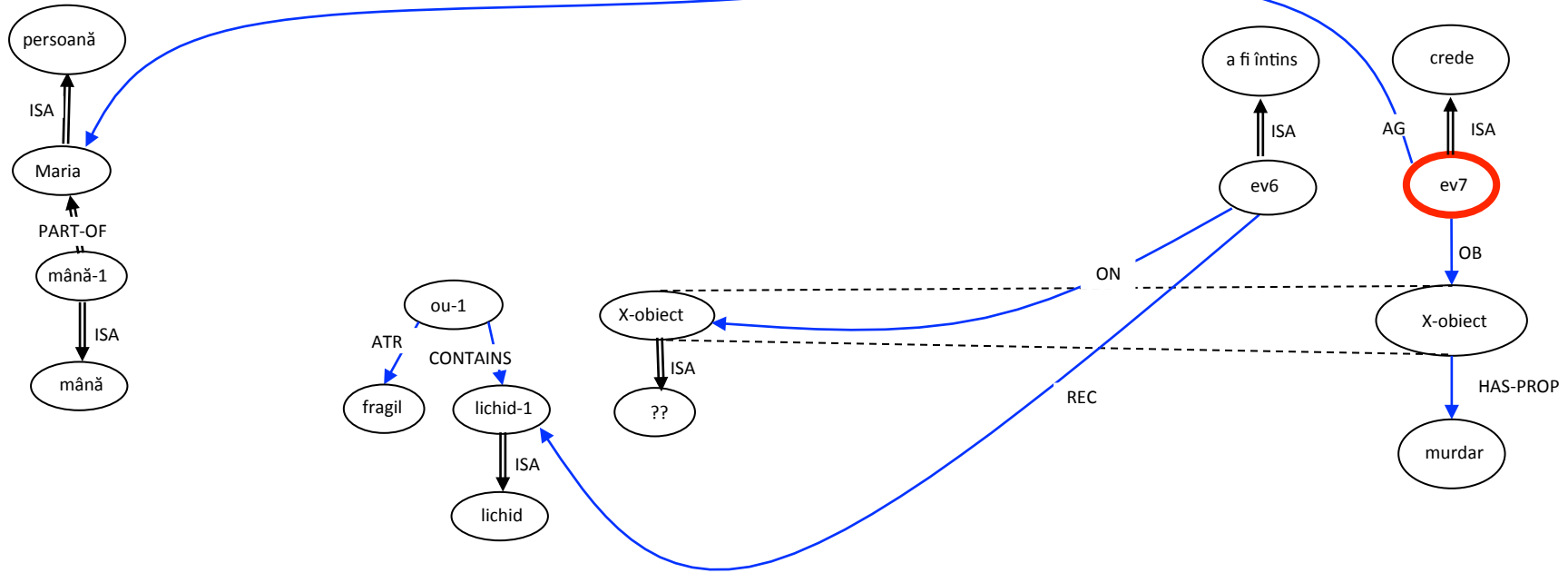


Reguli de modelare a proceselor cognitive



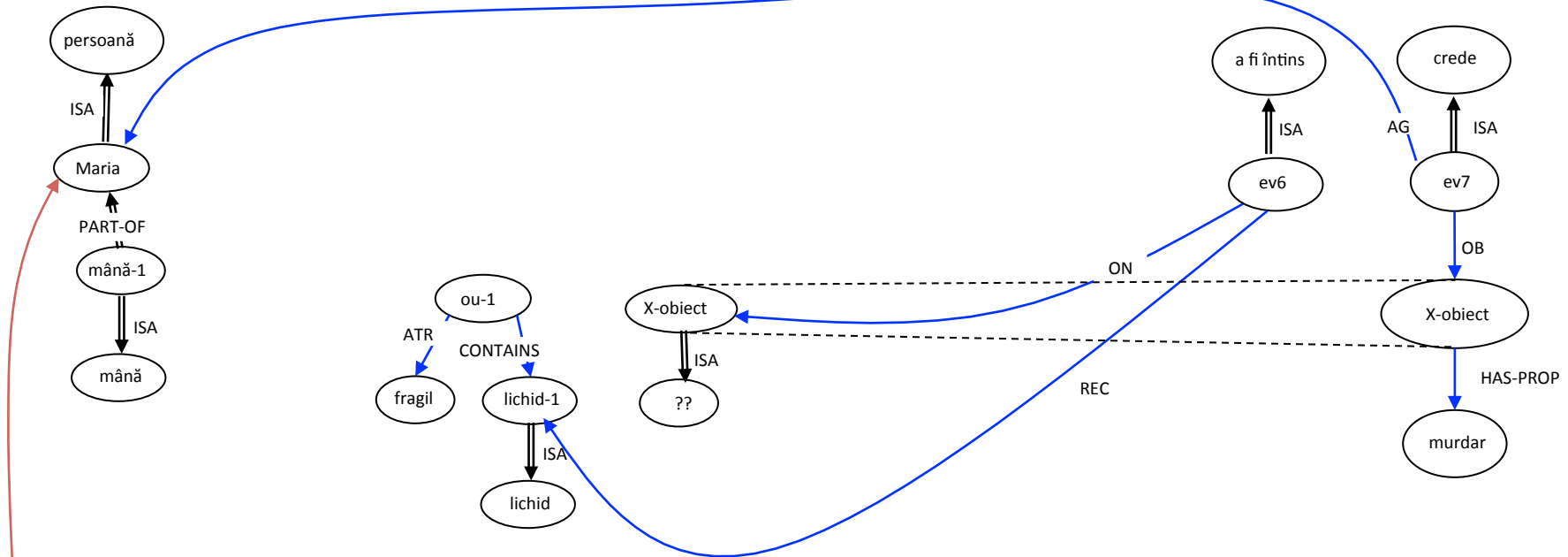


1. *Maria a scăpat oul din mână.*

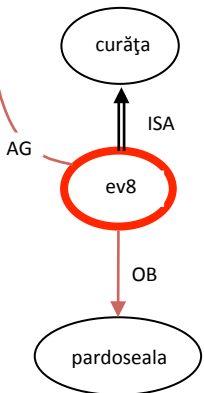




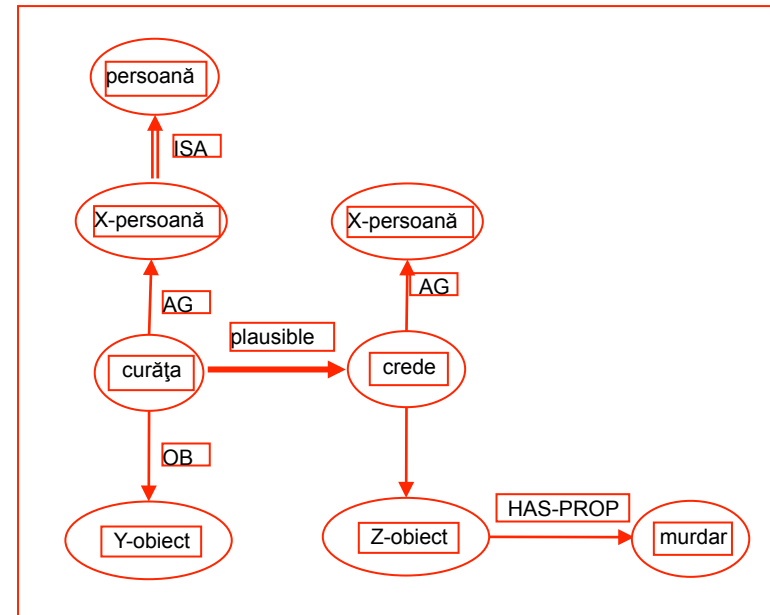
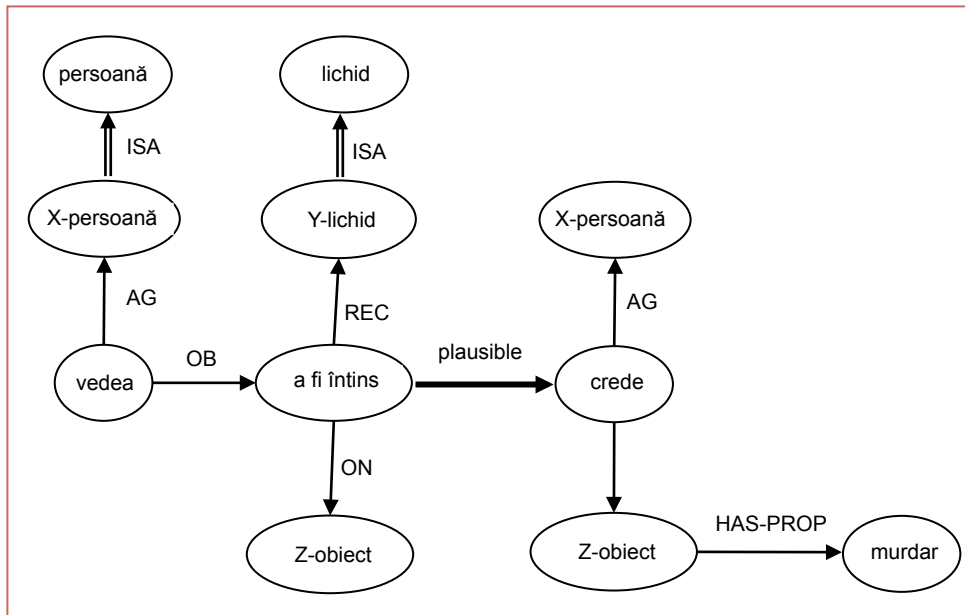
1. Maria a scăpat oul din mână.

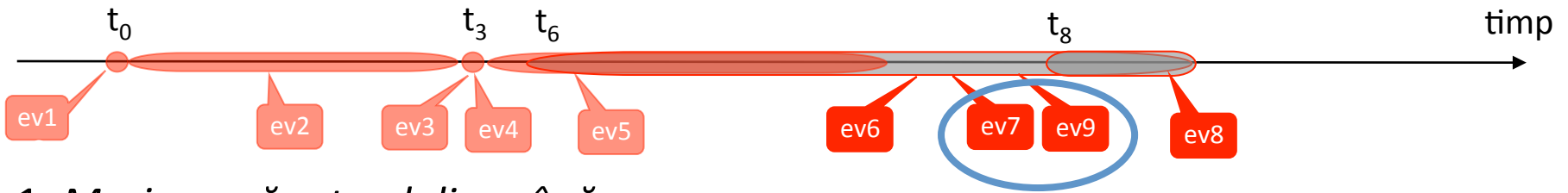


2. Ea a curăţat apoi pardoseala.

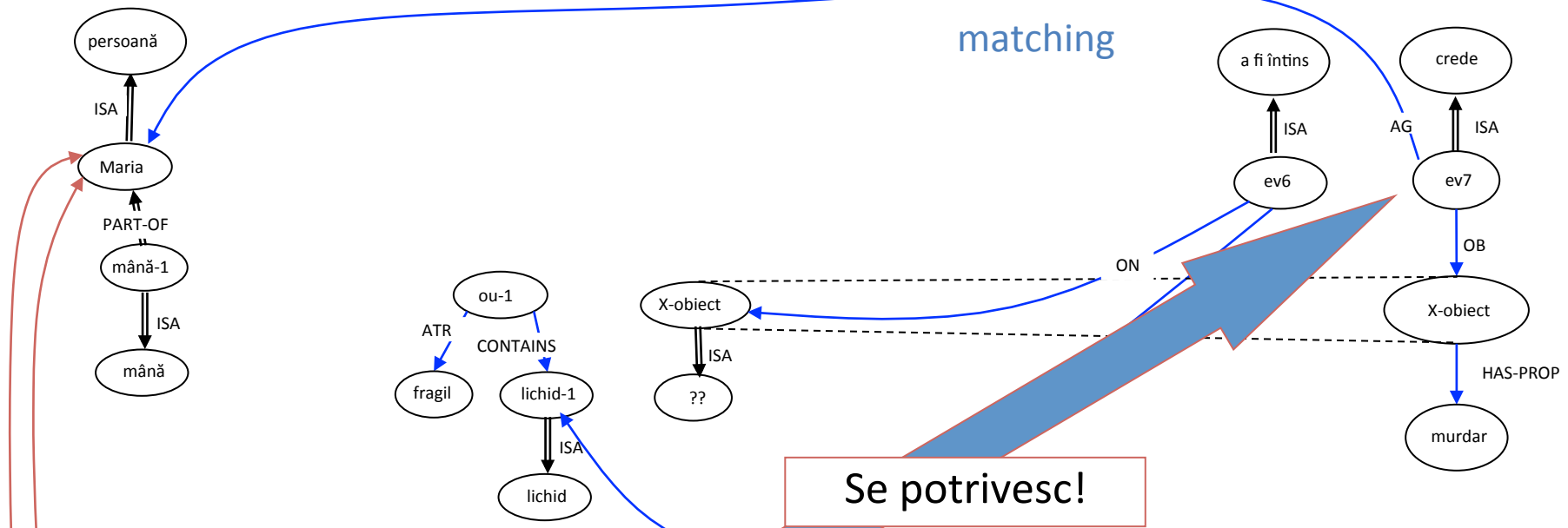


Reguli de modelare a proceselor cognitive

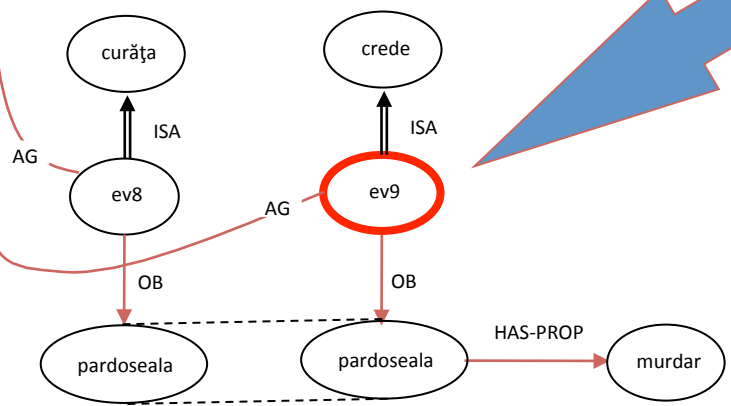


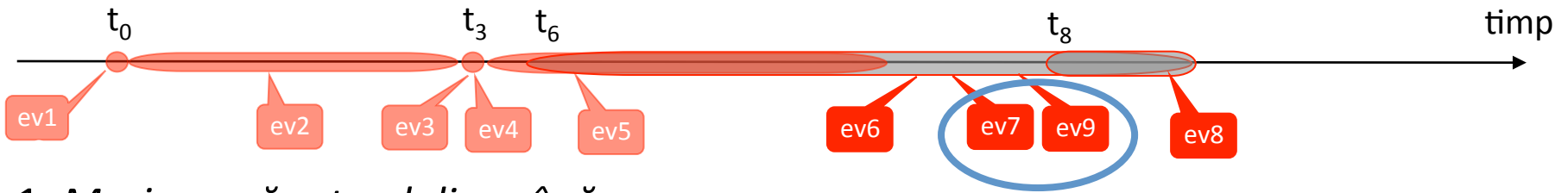


1. *Maria a scăpat oul din mână.*

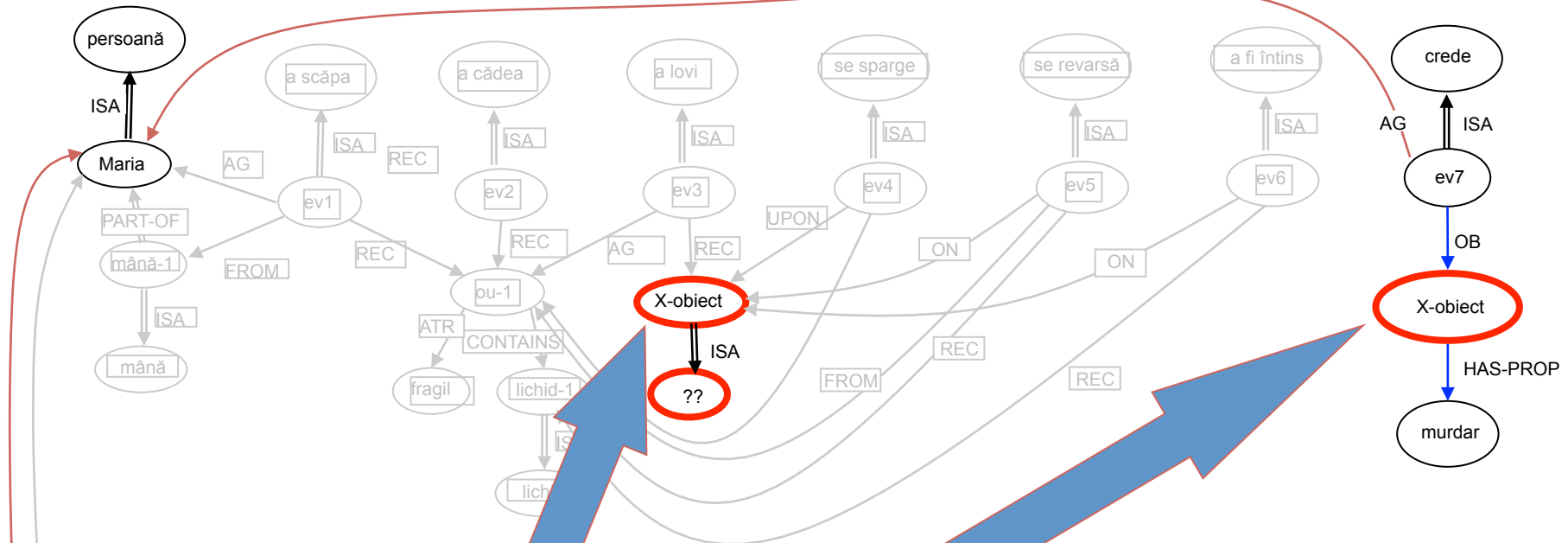


2. *Ea a curățat apoi pardoseala.*

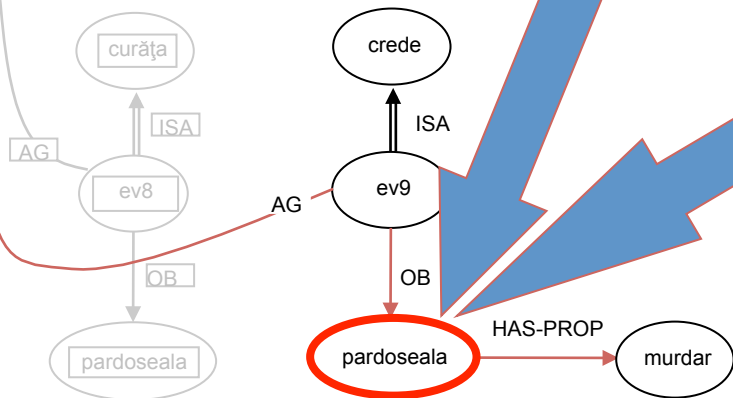


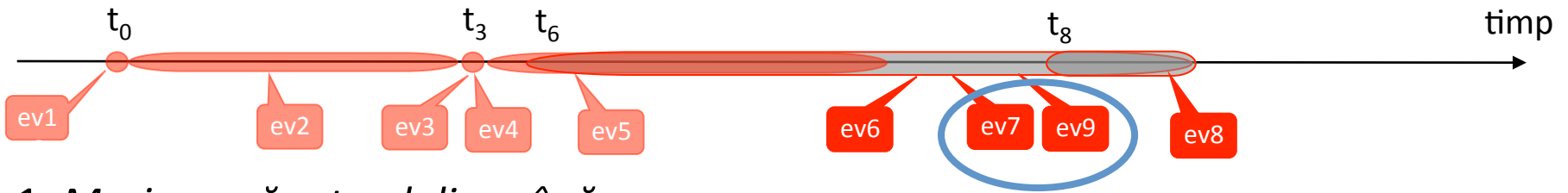


1. *Maria a scăpat oul din mână.*

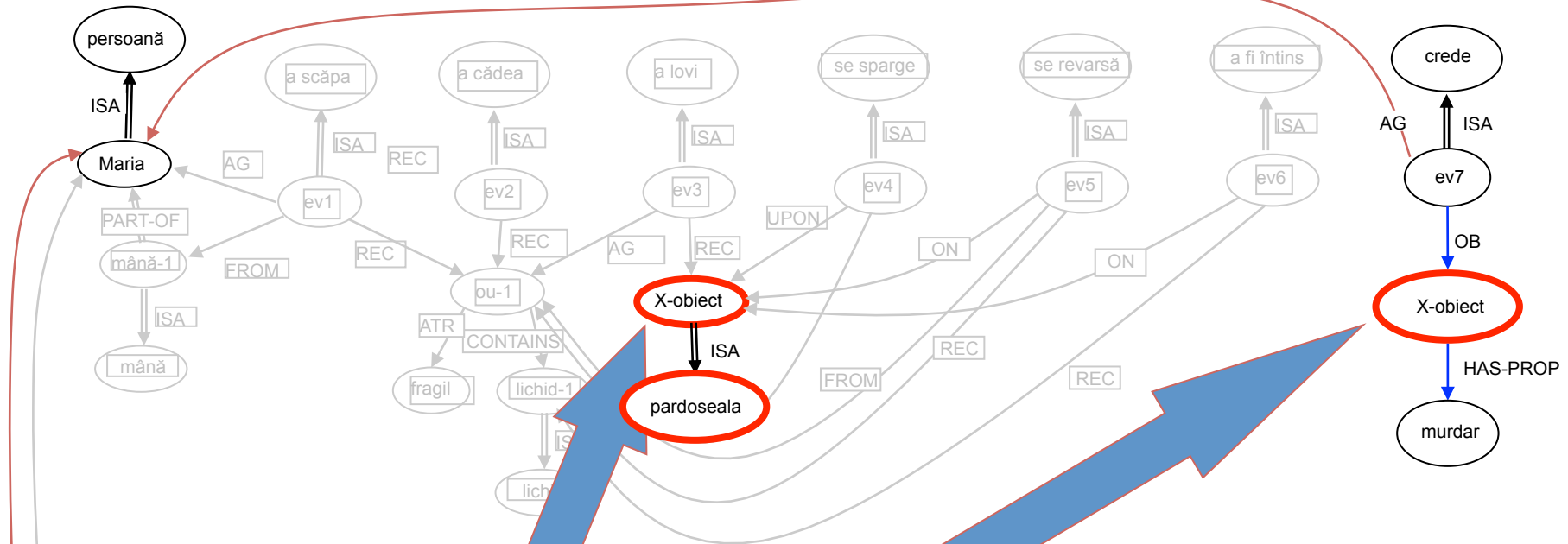


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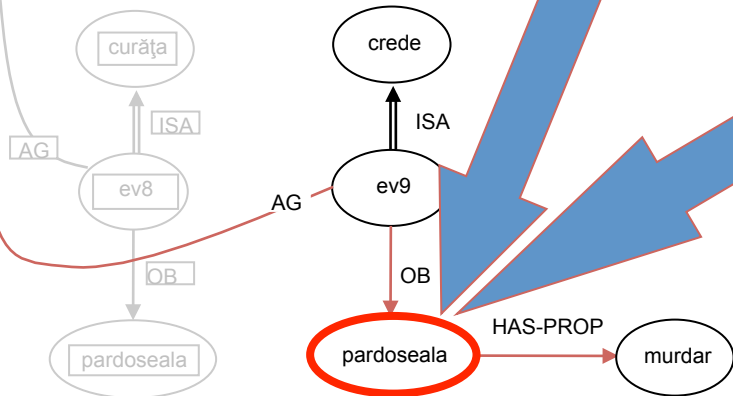




1. *Maria a scăpat oul din mână.*



2. *Ea a curățat apoi pardoseala.*



Înțelegem...