

# Models

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# Models and Truth

# Henry walks

Model M:

$$D = \{h, w, s\}$$

Proper Names:

$$\llbracket \text{henry} \rrbracket^M = h$$

$$\llbracket \text{sue} \rrbracket^M = s$$

$$\llbracket \text{walter} \rrbracket^M = w$$

Nouns:

$$\llbracket \text{woman} \rrbracket^M = \{s\}$$

$$\llbracket \text{man} \rrbracket^M = \{h, w\}$$

Verbs:

$$\llbracket \text{walk} \rrbracket^M = \{h, w\}$$

$$\llbracket \text{love} \rrbracket^M = \{\langle h, w \rangle, \langle s, w \rangle\}$$

$$\begin{aligned} \llbracket \text{walk}(\text{henry}) \rrbracket^M &= \text{True since} \\ &\quad \llbracket \text{henry} \rrbracket^M \in \llbracket \text{walk} \rrbracket^M \\ &\quad \text{since} \\ &\quad h \in \{h, w\} \end{aligned}$$

# Model elements

The model:

$$M = \langle D, \llbracket \ \rrbracket \rangle$$

1. Domain  $D$ : set of entities

$$D = \{h, w, s\}$$

2. Interpretation  $\llbracket \ \rrbracket$ : Assignments of semantic values to elements of the language:

Proper Names:

$$\llbracket \text{henry} \rrbracket^M = h$$

$$\llbracket \text{sue} \rrbracket^M = s$$

$$\llbracket \text{walter} \rrbracket^M = w$$

Different models can supply different interpretations, so we use  $\llbracket \ \rrbracket^M$  when we want to specify which model's interpretation we mean.

3. Models can supply intensions as semantic values as well as extensions. This one supplies extensions.

# Interpretation Rule

A rule: P stands for any predicate, c for any constant.

$$\begin{aligned} \llbracket P(c) \rrbracket^M &= \text{True iff} \\ &\llbracket C \rrbracket^M \in \llbracket P \rrbracket^M \end{aligned}$$

$$\begin{aligned} \llbracket P(\text{henry}) \rrbracket^M &= \text{True since} \\ &\llbracket \text{henry} \rrbracket^M \in \llbracket \text{walk} \rrbracket^M \\ &\text{since} \\ &h \in \{h, w\} \end{aligned}$$

# every man walks

$\llbracket \forall x [\text{man}(x) \rightarrow \text{walk}(x)] \rrbracket^M = \text{True}$  since for all  $x$

$\llbracket [\text{man}(x) \rightarrow \text{walk}(x)] \rrbracket^M = \text{True}$

since

$x = w$      $\text{man}(x) \rightarrow \text{walk}(x)$  and  
                  T                    T

T

$x = h$      $\text{man}(x) \rightarrow \text{walk}(x)$  and  
                  T                    T

T

$x = s$      $\text{man}(x) \rightarrow \text{walk}(x)$   
                  F                    T

T

# every woman walks

$$\llbracket \forall x [\text{woman}(x) \rightarrow \text{walk}(x)] \rrbracket^M = \text{False}$$

since there exists  $x$

$$\llbracket [\text{woman}(x) \rightarrow \text{walk}(x)] \rrbracket^M = \text{False}$$

since

$$\begin{array}{ccccc} x = s & \text{woman}(x) & \rightarrow & \text{walk}(x) & \\ & \text{T} & & \text{F} & \\ & & & & \text{F} \end{array}$$



# Presupposition, Entailment

# Entailments

An entailment of  $p$  is a sentence  $q$  that must be true if  $p$  is true.

- (1)
  - a. John shot a yellow unicorn.
  - b. John shot a unicorn.
  - c. There existed a unicorn.
  - d. John intended to shoot a unicorn.

1. Entailment test: Whenever (a) is true, (b) must be true. [b is an entailment of a]
2. Entailment test: Whenever (a) is true, (c) must be true. [c is an entailment of a]
3. Entailment test: (c) can be false when (a) is true. [c is NOT an entailment of a]

# Presuppositions

Presuppositions are entailments that persist under negation.

- (2) a. The present King of France is bald.
- b. There exists a present king of France.
- c. The present King of France is not bald.  
          [negation of (a)]

1. Entailment test: Whenever (a) is true, (b) must be true.
2. Negation test: Whenever (c) is true, (b) must be true.

Conclusion: (b) is a presupposition of (a), since both (a) and the negation of (a) entail (b).

# Factives

Factives are verbs with sentential complements that **presuppose** the truth of their complements.

- (3)
- a. Mary regretted that John attended.
  - b. John attended.
  - c. Mary didn't regret that John attended.

Conclusion: (b) is a presupposition of (a), since both (a) and the negation of (a) entail (b).

Therefore, *regret* is a factive verb, since it is a verb with a sentential complement that presupposes its complement is true.

# A factive Adjective?

- (4)
  - a. Mary is right that John has agreed to attend tonight.
  - b. John has agreed to attend tonight.
  - c. Mary is not right that John has agreed to attend tonight.
- 1. Entailment test: ?
- 2. Negation test: ?