

Prototype

small furry
animal
long bushy tail,
eats nuts,...

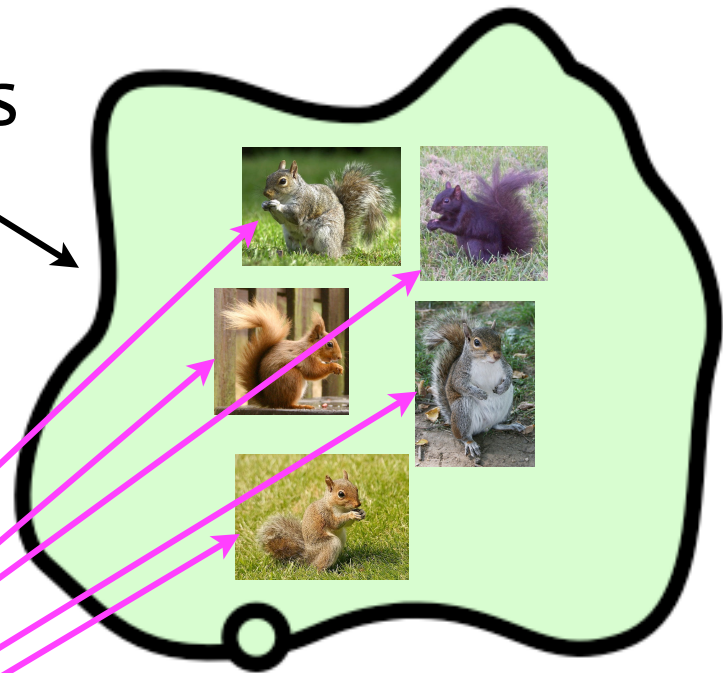
Similarity comparison



Exemplar models

- In some models, new instances are evaluated by comparing them only to stored instances of the category, called **exemplars**
- In exemplar models, there is no generalization or abstraction per se (and no prototype)

Stored exemplars



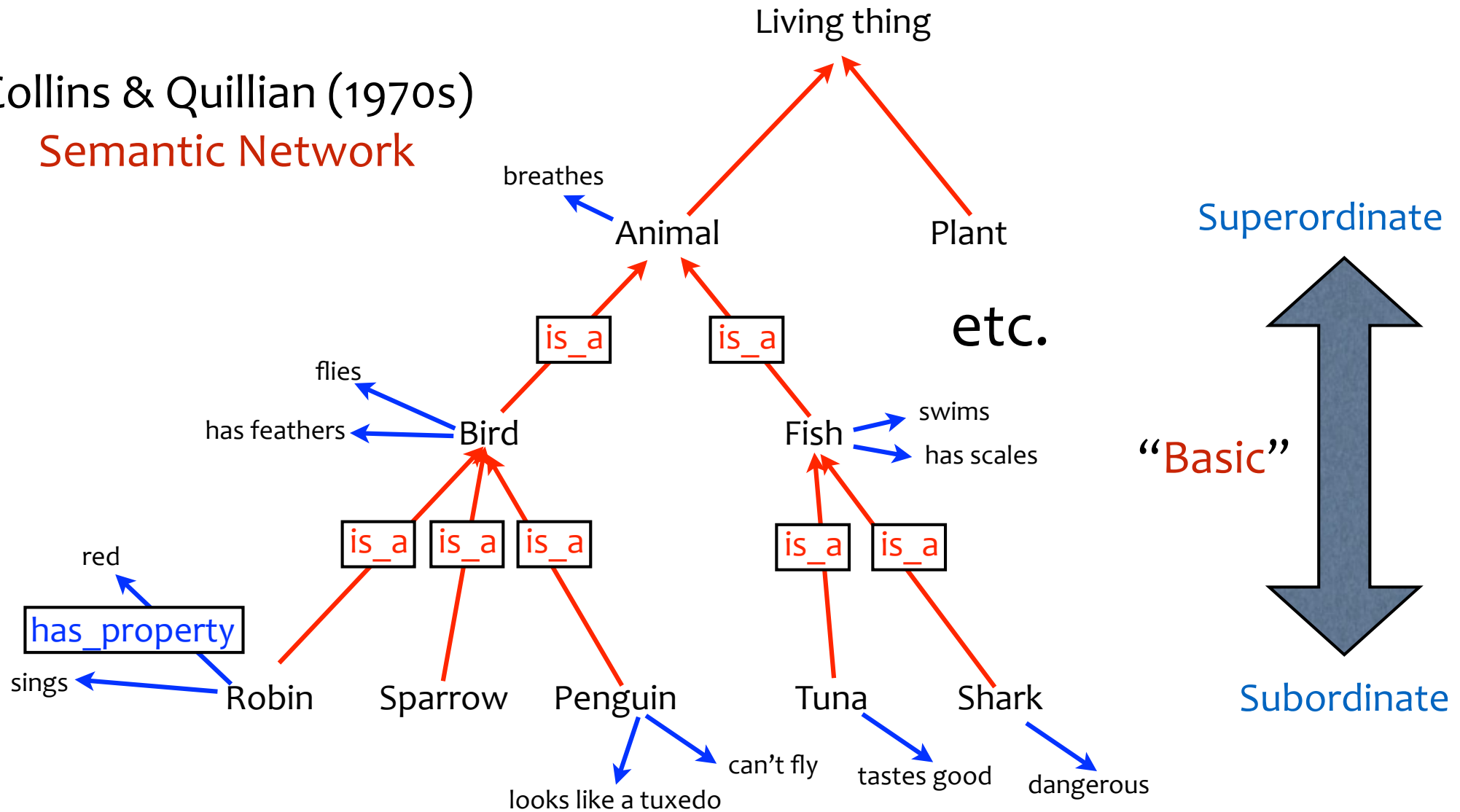
Similarity comparison



Hierarchical/taxonomic representation of concepts

Collins & Quillian (1970s)

Semantic Network



Property inheritance

- If:

x **is_a** y

y **has_property** z

then

x **has_property** z

- This rule allows properties to be “known” without being directly stored

- This allows both prototypical and atypical properties to be represented efficiently

Basic-level categories

- The **basic level** (Rosch, 1973) is the level of the concept hierarchy that
 - corresponds to children's early words
 - corresponds to high-frequency words
 - maximizes within-category similarity
- (The tale of the many Eskimo words for snow)

Prototype models vs. exemplar models

- For decades, psychological research about concepts was a battle between prototype models and exemplar models
- Some evidence favor prototype models
 - e.g. When trained on examples that exclude highly typical examples, subjects seem to induce the prototype (**prototypification**)
- However most quantitative evidence seemed to favor exemplar models, e.g. Nosofsky's Generalized Context Model (GCM)
- More recently, there is evidence that subjects use a prototype strategy **early in training**, but gradually shift to an exemplar strategy