PSYC 3320/5597: Psycholinguistics

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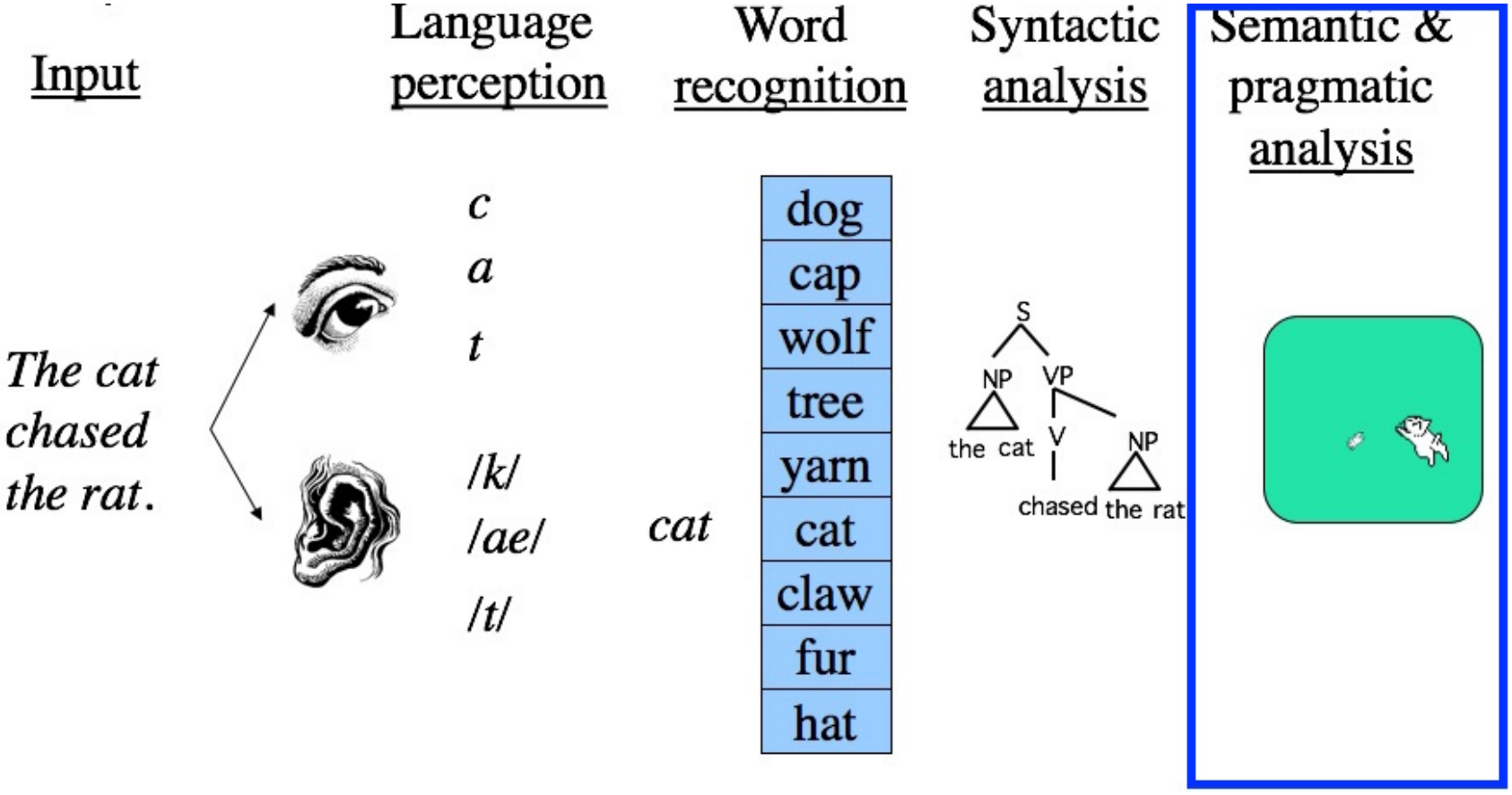
Unit 7 – Word meaning

Word comprehension



Semantic analysis of words

Questions:

- What is meaning?
- How do words relate to meaning?
- How do we store and organize words?

Separation of words and meaning

Words are NOT the same as meaning

- Words are symbols linked to mental representations of meaning (concepts)
- Concepts and words are different things
  - Translation argument – we can translate words between languages
  - Imperfect mapping – some words have more than one meaning (ambiguity); some words have same meaning as other words (synonyms)
  - Elasticity of meaning – meaning of words can depend on context (e.g., big ant versus big elephant

What is meaning?

- Meaning is more than just associations!
  - "baby" and "cradle" are associated..do they mean the same thing?
    - The child slept in the cradle.
    - The child slept in the baby
- Frege (1892) – sense versus reference
  - the planet Venus is often called "the morning star" and "the evening star". Both are different senses for the same reference

Modern views of meaning

- Semantic networks
- Feature list models
- Instance/exemplar models
- Prototype models

Semantic networks

Semantic networks – words are represented as an interconnected network of sense relations

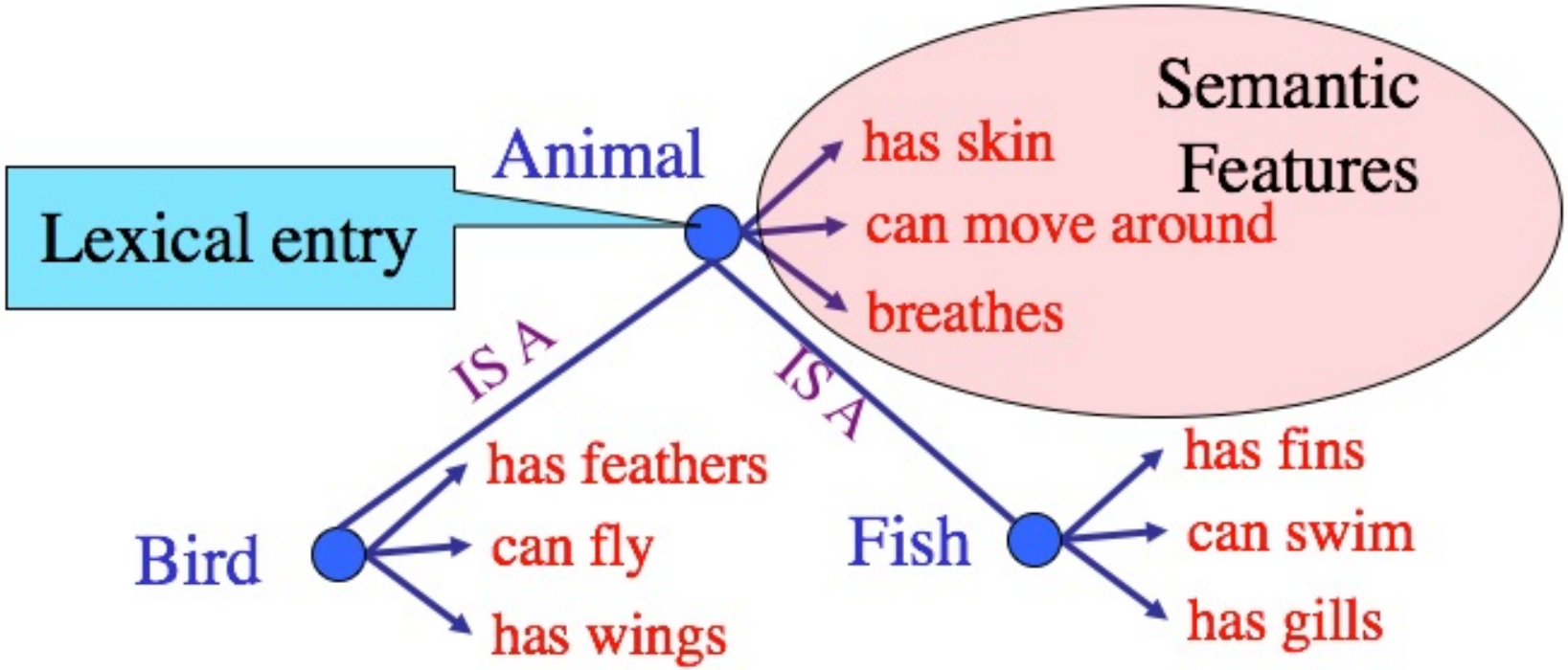
- Each word is a particular node
- Connections between nodes represent semantic relationships

Semantic networks

Collins & Quillian (1969) – Hierarchical Network Model

- Lexical entries stored in a hierarchy
- Hierarchical representation permits cognitive economy (reduces redundancy of semantic features

Semantic network

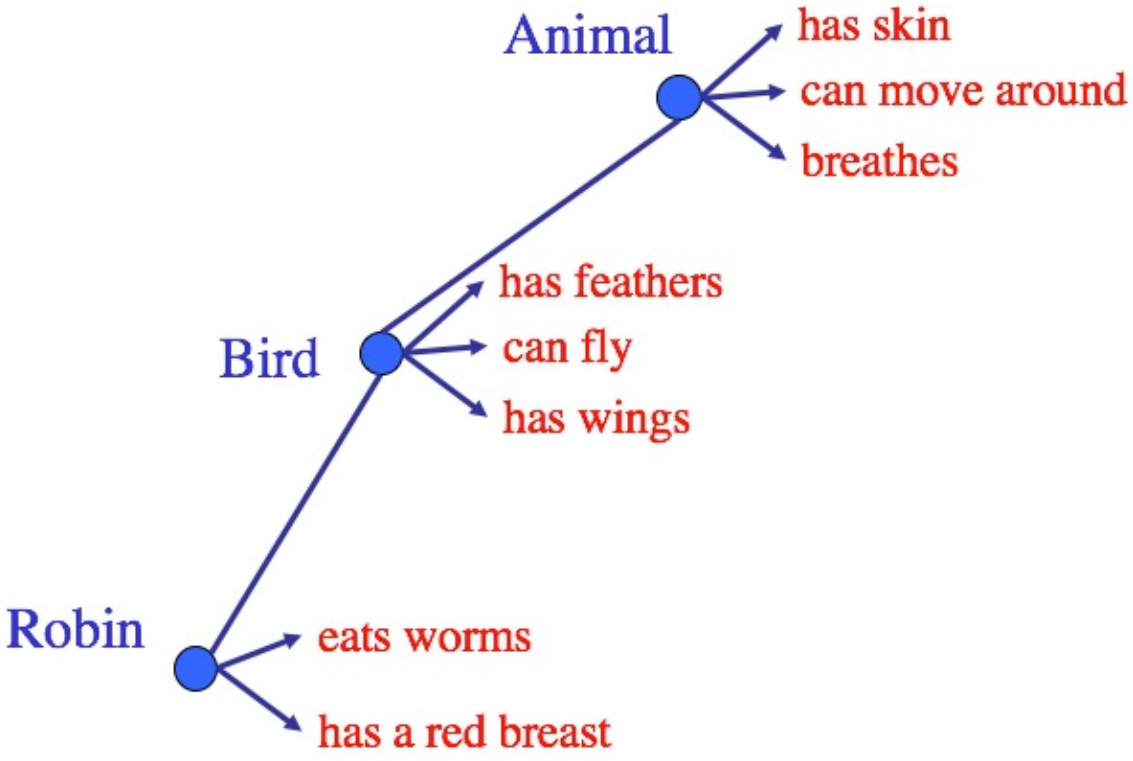


Semantic network

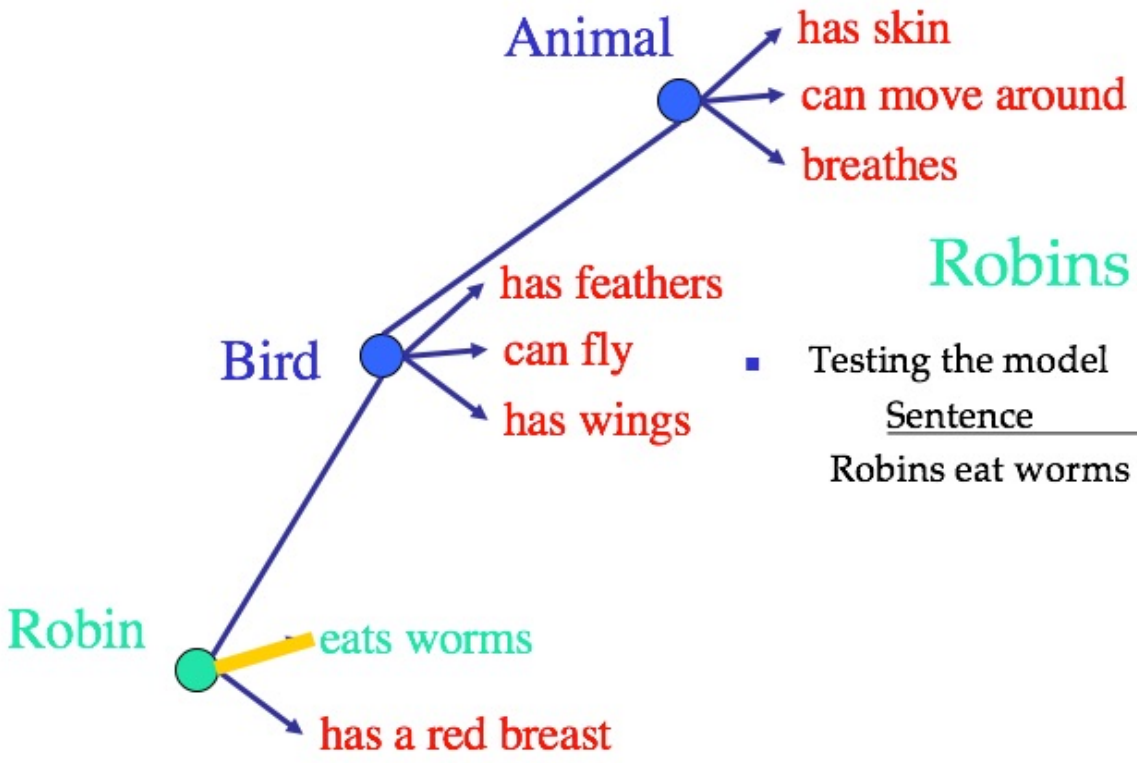
Testing the model

- give participants a semantic verification task
- Example: “An apple has teeth”
- Measure RTs

Semantic verification task



Semantic verification task

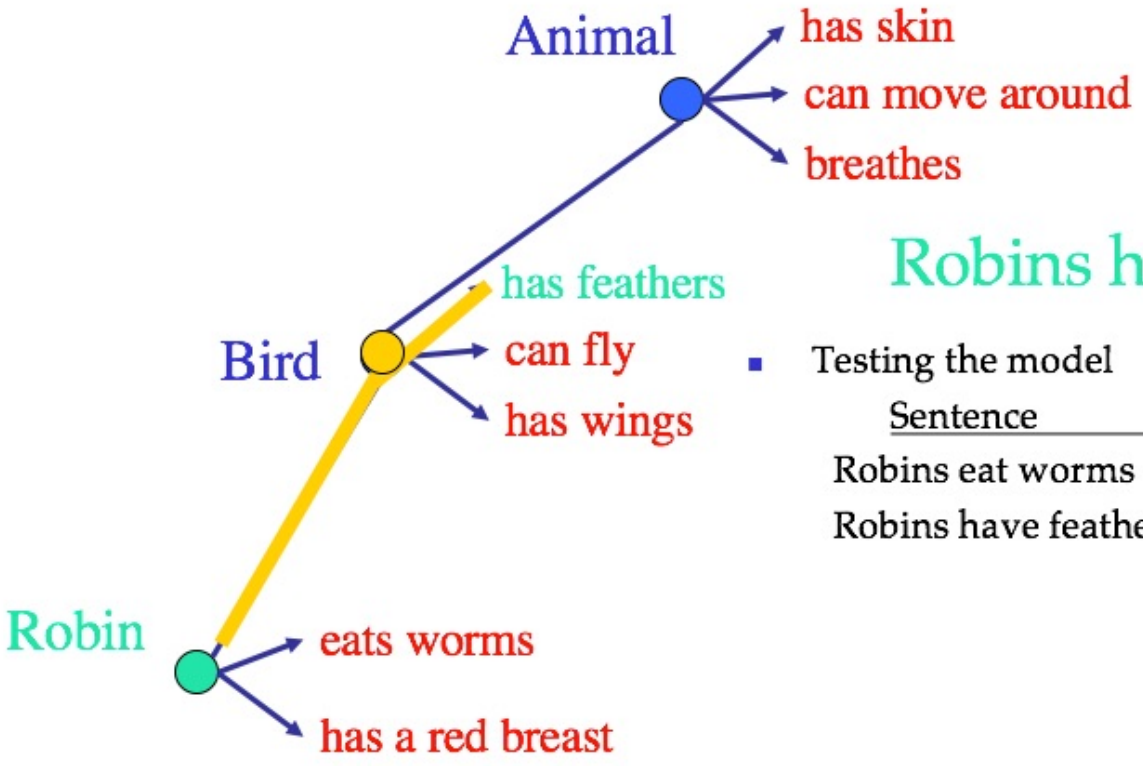


Robins eat worms

- Testing the model

Sentence	Verification time
Robins eat worms	1310 msecs

Semantic verification task

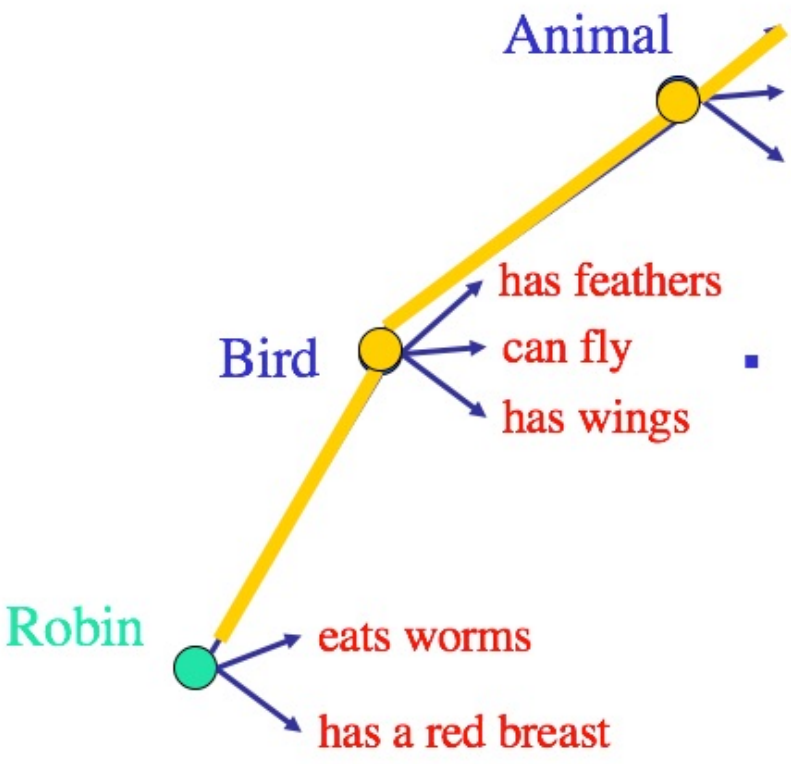


Robins have feathers

- Testing the model

Sentence	Verification time
Robins eat worms	1310 msecs
Robins have feathers	1380 msecs

Semantic verification task



Robins have skin

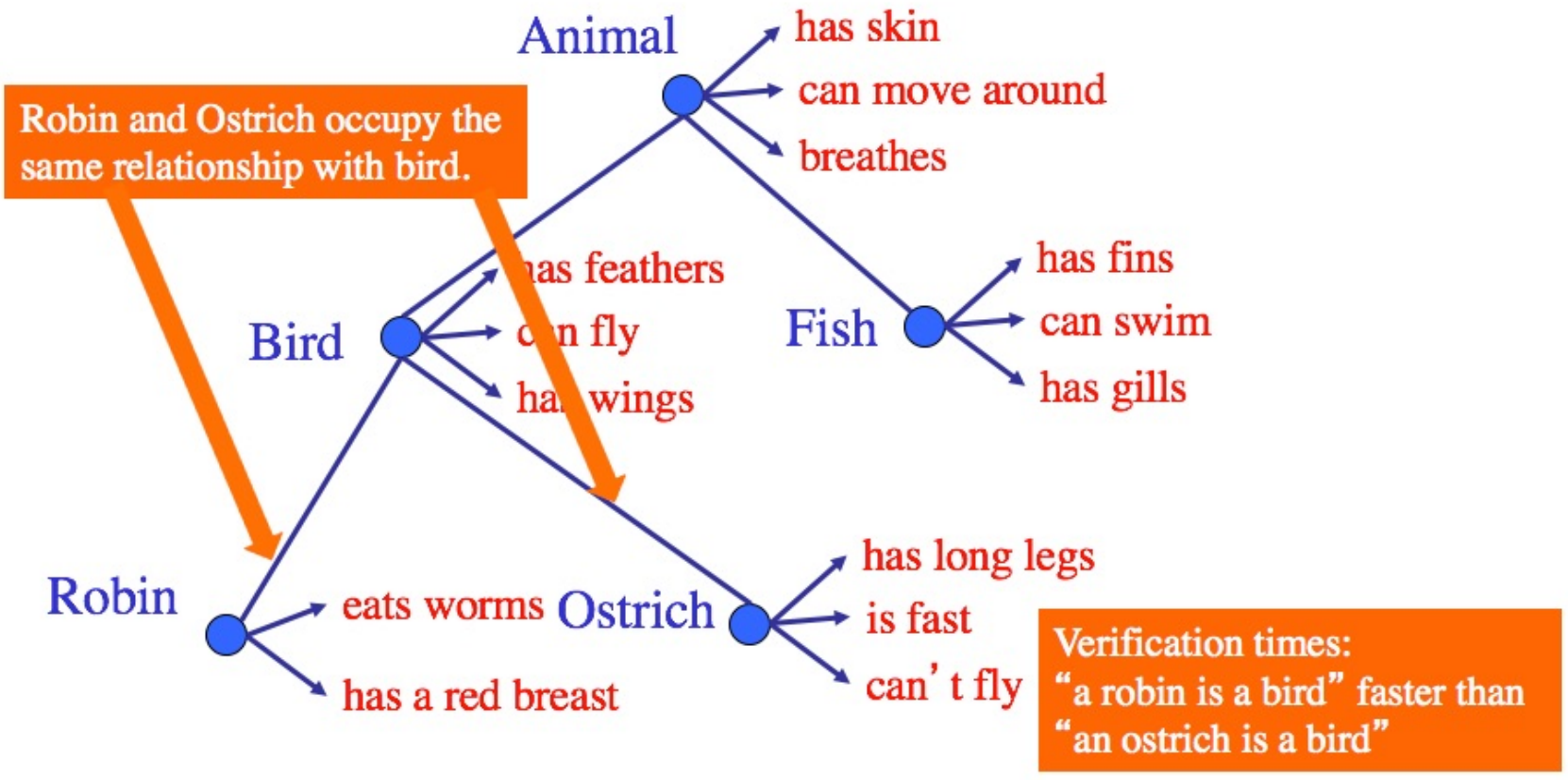
- Testing the model

Sentence	Verification time
Robins eat worms	1310 msecs
Robins have feathers	1380 msecs
Robins have skin	1470 msecs

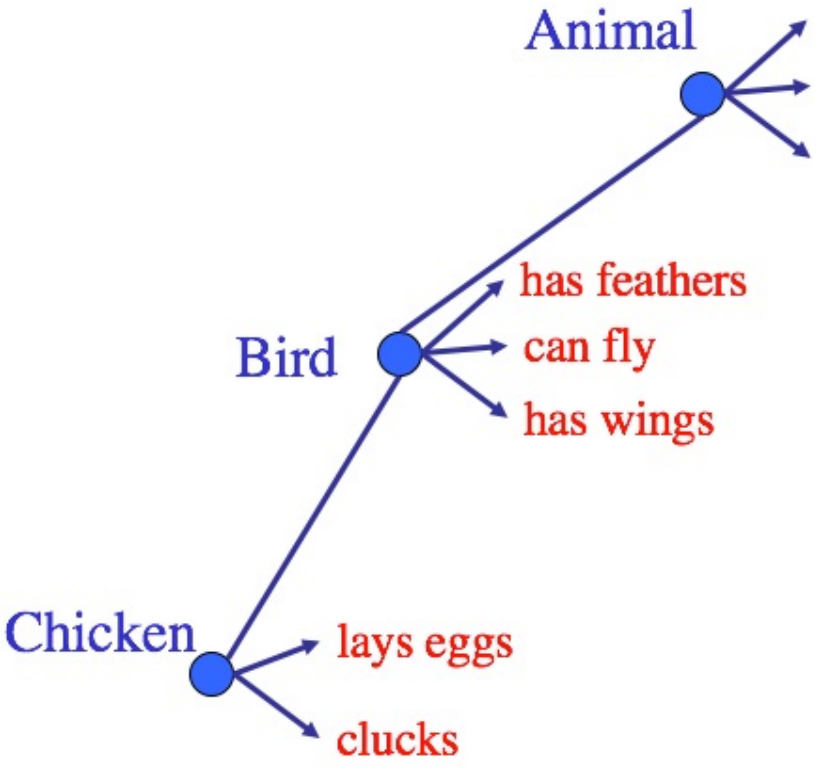
Problems with Collins & Quillian model

- Difficulty representing some relationships
  - How are "truth", "justice", and "law" related?
- Effect may be due to frequency of association
  - "A robin breathes" is less frequent than "A robin eats worms"
- The typicality effect
  - People faster to reject "A horse is a fish" than "A whale is a fish", though both horse and whale are mammals (same level in hierarchy)

Problems with Collins & Quillian model



Problems with Collins & Quillian model

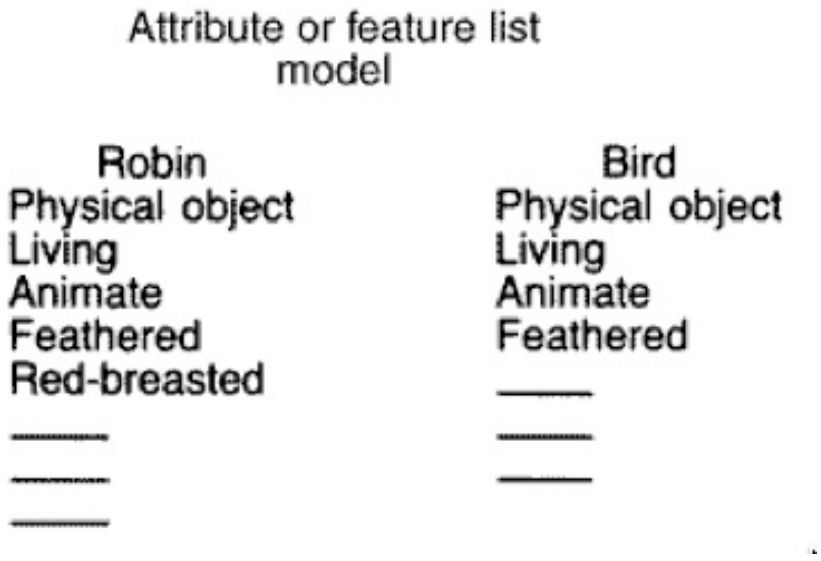


- Smith, Shoben & Rips (1974) showed that there are hierarchies where more distant categories can be faster to categorize than closer ones
  - **A chicken is a bird**

    was slower to verify than
  - **A chicken is an animal**

Feature comparison model

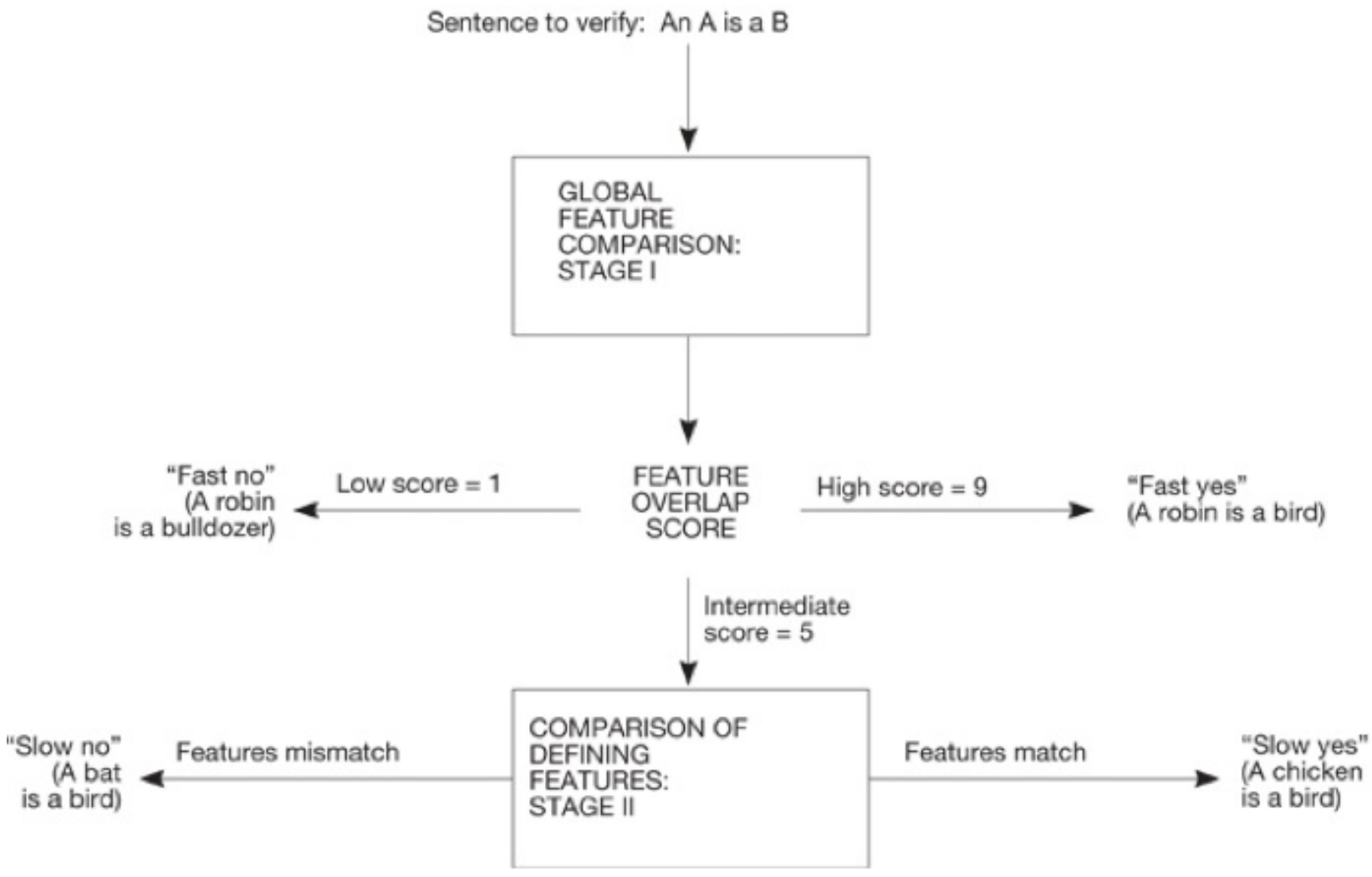
Smith, Rips, & Shoben (1974)



- Concepts represented in terms of defining features and characteristic features
- Two-stage feature comparison process

Feature comparison model

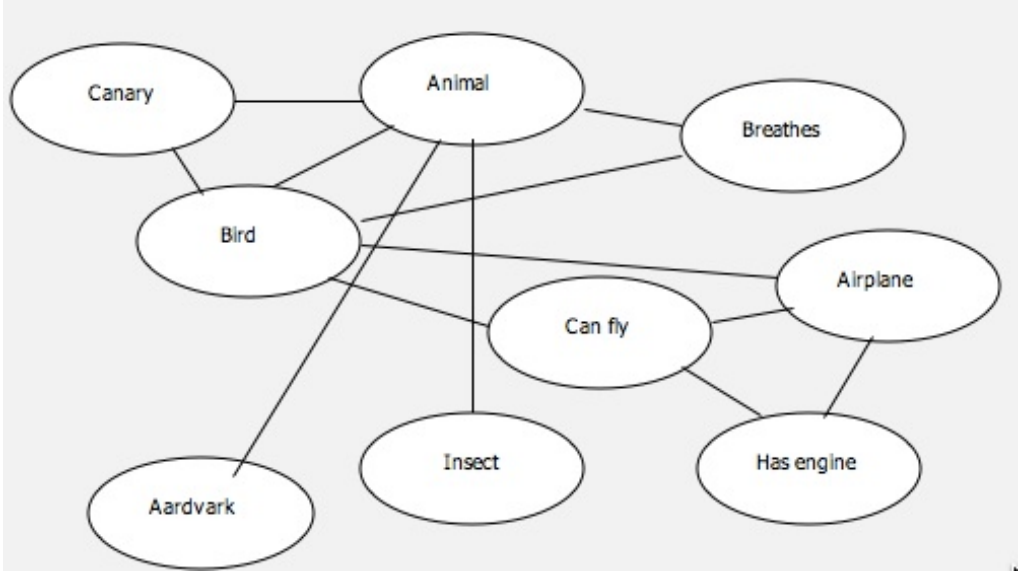
Smith, Rips, & Shoben (1974)



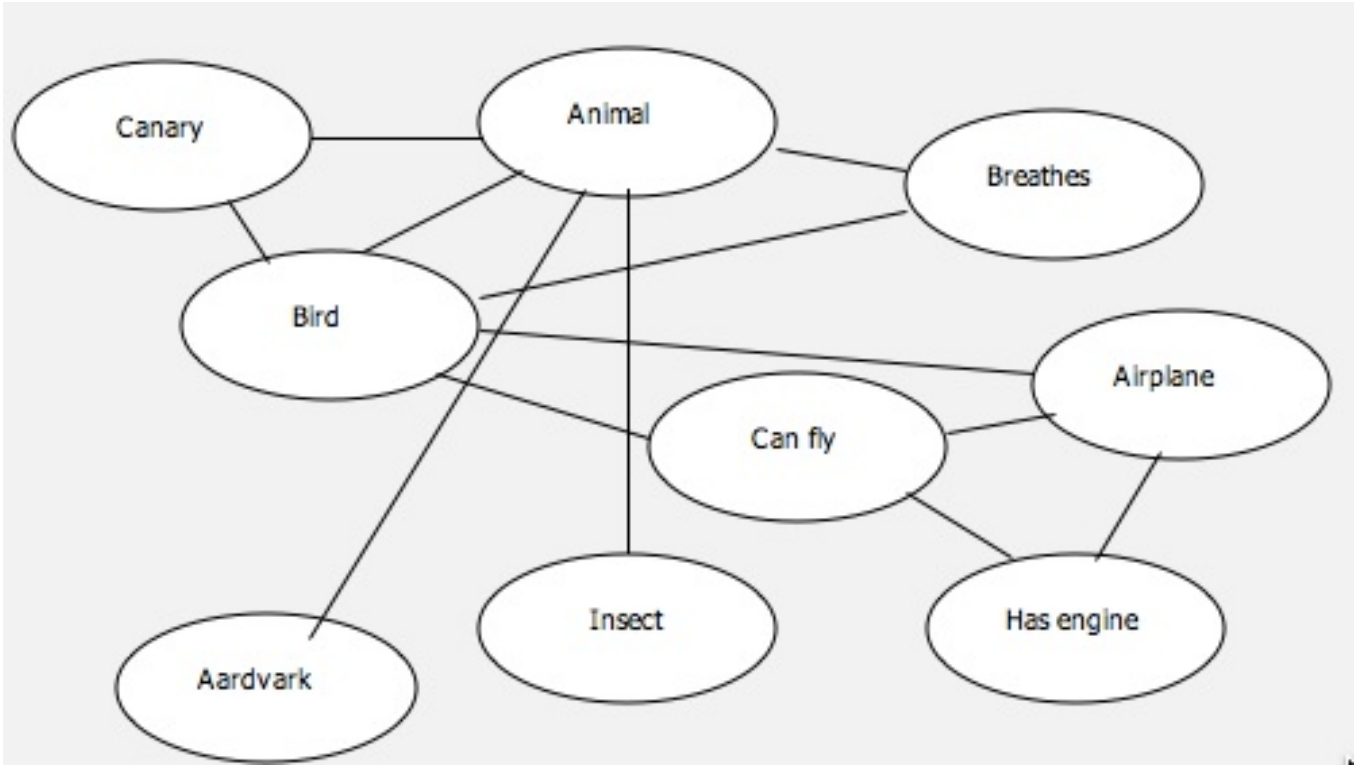
Spreading activation model

Collins & Loftus (1975)

- Extends Collins & Quillian in the following ways:
  - Concepts and properties are treated equally, and each can be directly accessed
  - Links between units of information vary in length according to associative strength



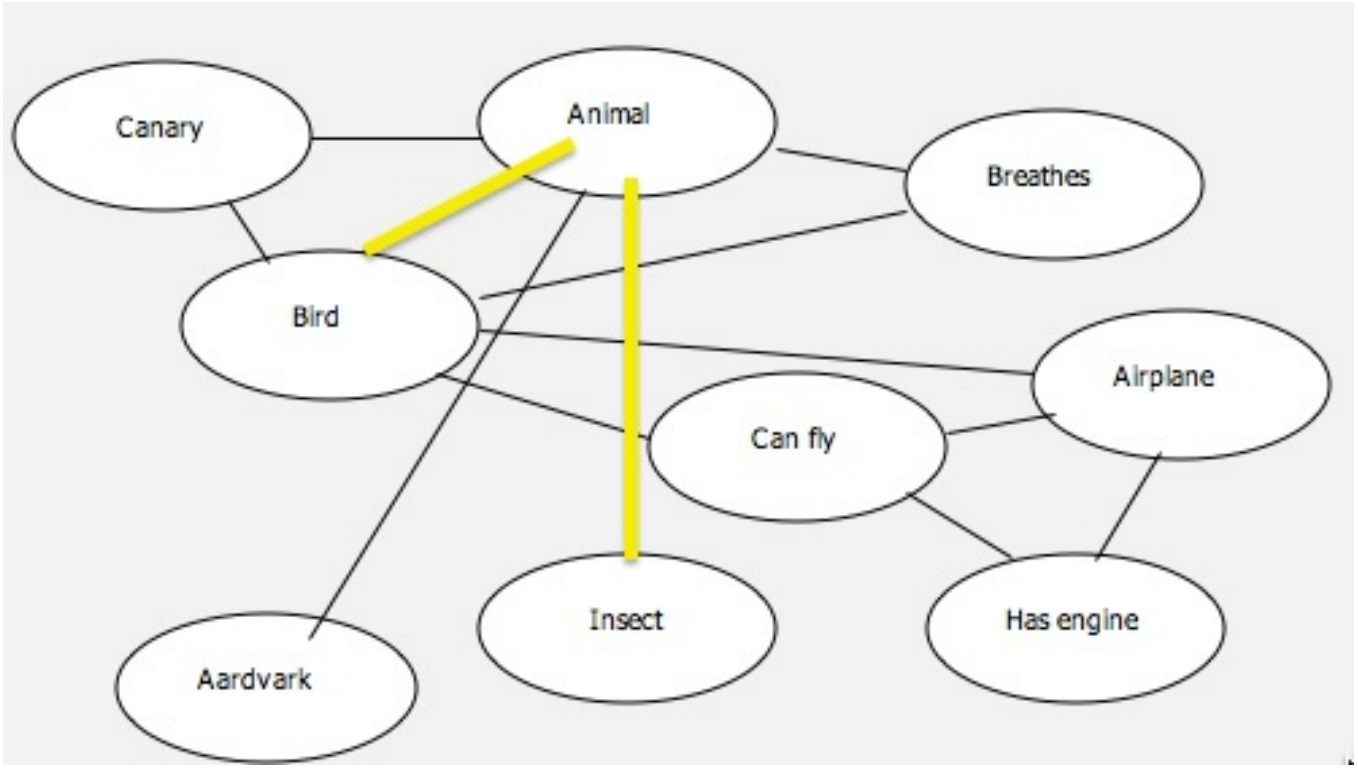
Spreading activation model



Typicality effect – which is faster to verify?

- A bird is an animal
- An insect is an animal

Spreading activation model



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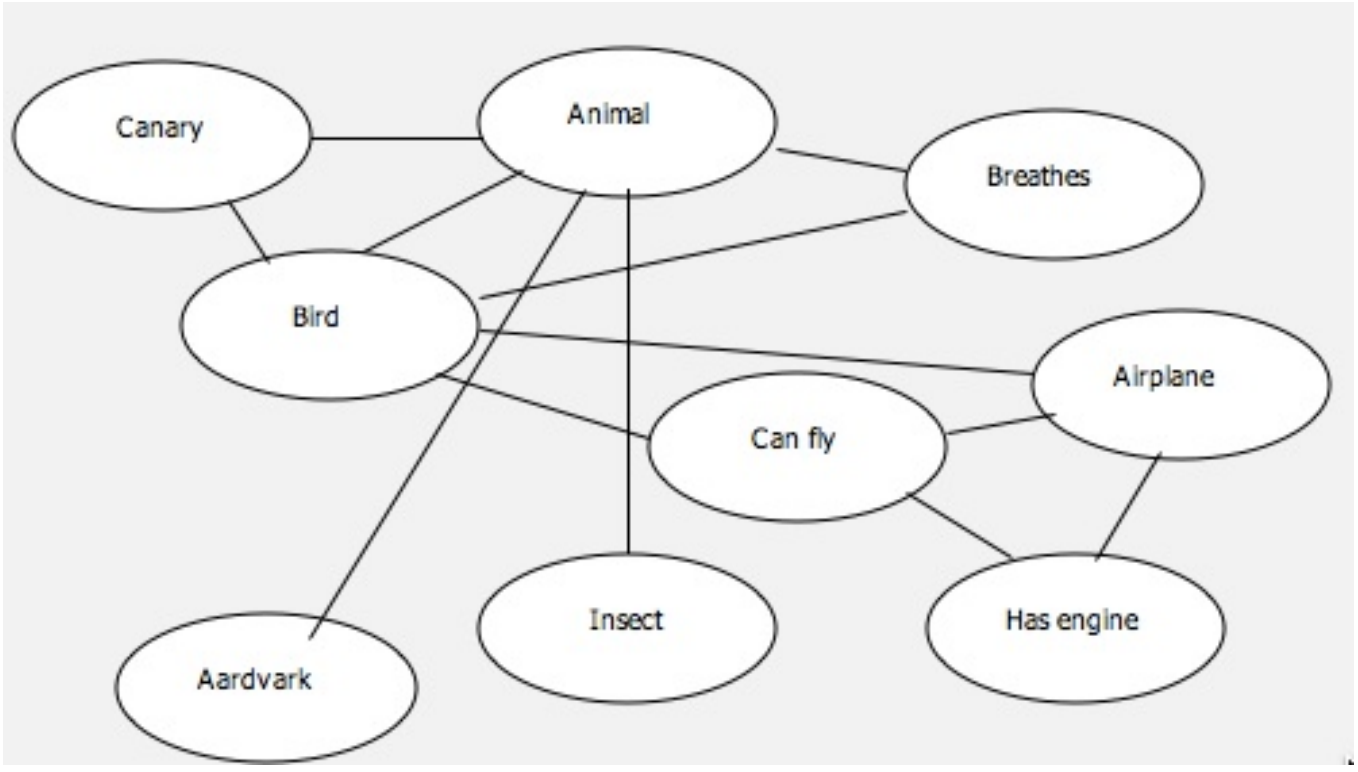
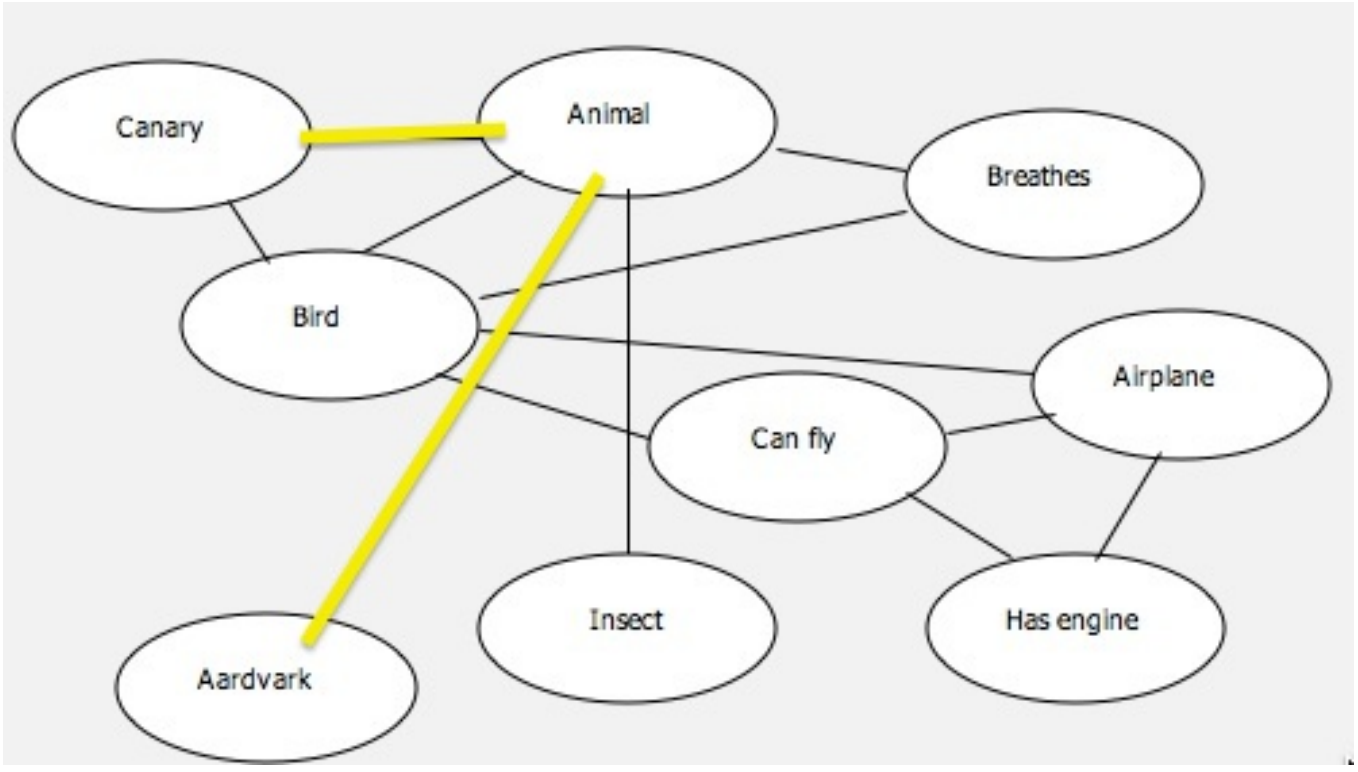
Spreading activation model



Familiarity effect – which is faster to verify?

- A canary is an animal
- An aardvark is an animal

Spreading activation model



Familiarity effect – which is faster to verify?

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Other models of meaning

Semantic feature lists (Schank, 1972; Katz & Fodor, 1963)

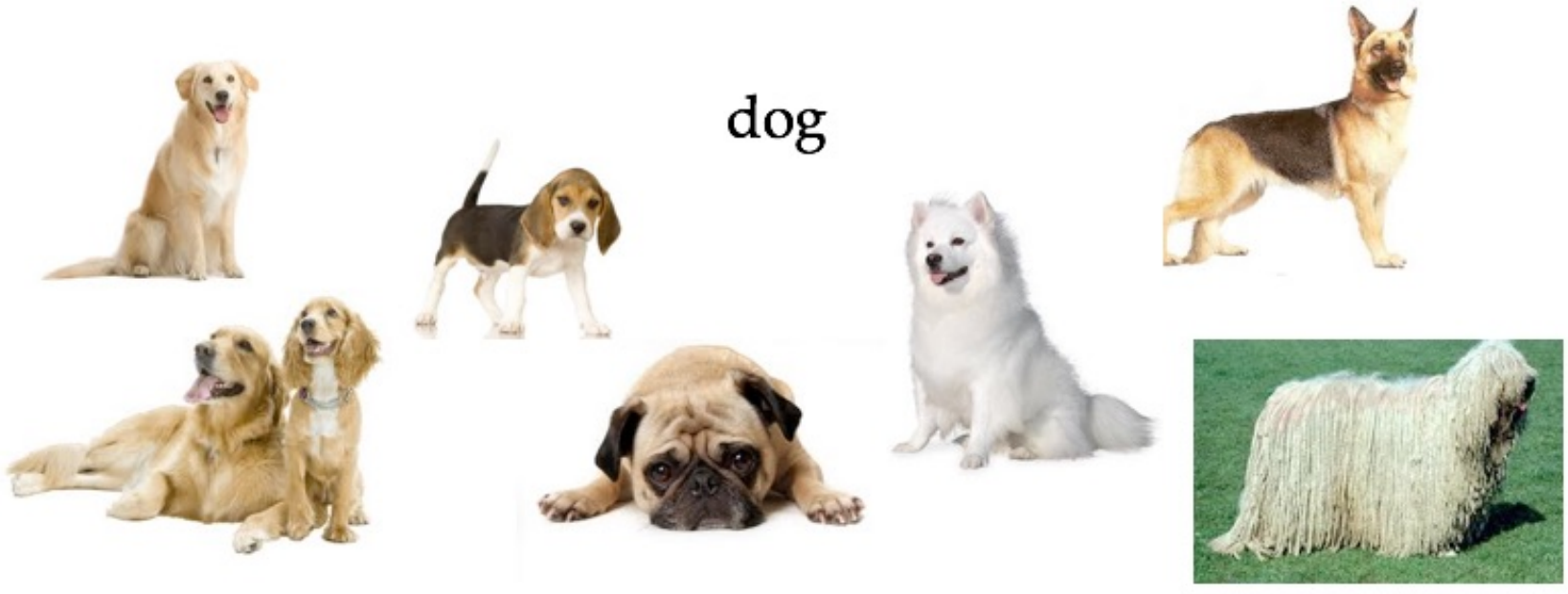
- decomposition of words into smaller semantic primitives
- part of feature comparison model of Smith, Rips, & Shoben (1974)
- Good for early computer models of semantics

Features	"father"	"mother"	"daughter"	"son"
Human	+	+	+	+
Older	+	+	-	-
Female	-	+	+	-

Other models of meaning

Instance theory (Medin & Schaffer, 1978)

- each concept represented as stored instances (also called exemplars
- make comparisons to stored instances
- probabilistic component – for example, which instance is more likely to be retrieved for comparison?



Other models of meaning

Prototype theory (Rosch, 1975)

- each concept represented as stored prototype (the average of instances in a category)
- make comparisons to prototype
- example: a robin is closer to prototypical bird than a penguin. Hence, we are quicker to verify that a robin is a bird.