

PHIL/PSYCH 256  
INTRODUCTION TO  
COGNITIVE SCIENCE

Week 4: Concepts

PLEASE TURN OFF AND PUT AWAY ALL  
ELECTRONIC DEVICES



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From: *The Meaning of Tingo*

- Neko-neko (Indonesian): person whose creative ideas make things worse.
- Mokito (New Guinea): truth that everyone knows but no one talks about.
- Morgenfrisk (Danish): fresh from a good night's sleep.
- Luftmensch (Yiddish): impractical dreamer
- Kummerspeck (German): weight gained from emotional overeating

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Concepts

Concept = mental representation of a class of objects or events. Schemas, frames.

Usually there is a corresponding word.

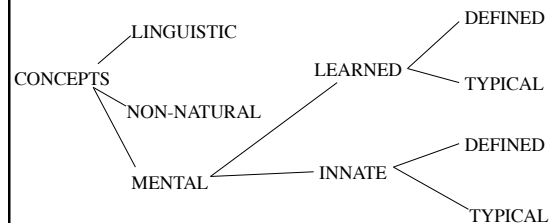
Rules are made out of concepts.

But concepts have associated rules.

Examples: What are some concepts that describe what you did last weekend?

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Theories of Concepts



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Concepts: Computational  
Power

Problem solving  
concepts as prototypes: representation of typical conditions  
inheritance based on hierarchies  
matching + completion  
spreading activation  
schema-based abduction

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Concepts: Computational  
Power

- Learning
  - definition
  - learning from examples
  - conceptual combination
- Language
  - mental lexicon, e.g. WordNet
  - cognitive grammar: syntax tied to semantics

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## Discussion Question

- What is the nature of your everyday concepts? Are they definable?



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## Concepts: Psychological power

- Prototype experiments (Rosch)
- Context important: exemplars, multimodal representations (Barsalou)
- Concepts as theoretical (Medin)



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## Concepts

- Neurological: specific deficits, e.g. living things, fruits & vegetables, musical instruments
- Practical:
  - AI systems: Ontology, semantic Web
  - Education: conceptual change

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## Medin

- The classical view of concepts based on defining features is unacceptable because of failure to specify defining features, goodness of example effects, and unclear cases.
- Prototype theories have also had empirical problems, with respect to context dependency, artificial categories, and ease of learning.
- Concepts are organized by theories, not just by similarity.
- Similarity involves interdependent features and higher-order relations.

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## Key Points

- The traditional view of concepts as definable using necessary and sufficient conditions is not compatible with psychological evidence.
- Concepts have characteristics of prototypes (schemas), exemplars, and causal explanations.
- Neural models can combine all these characteristics.

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