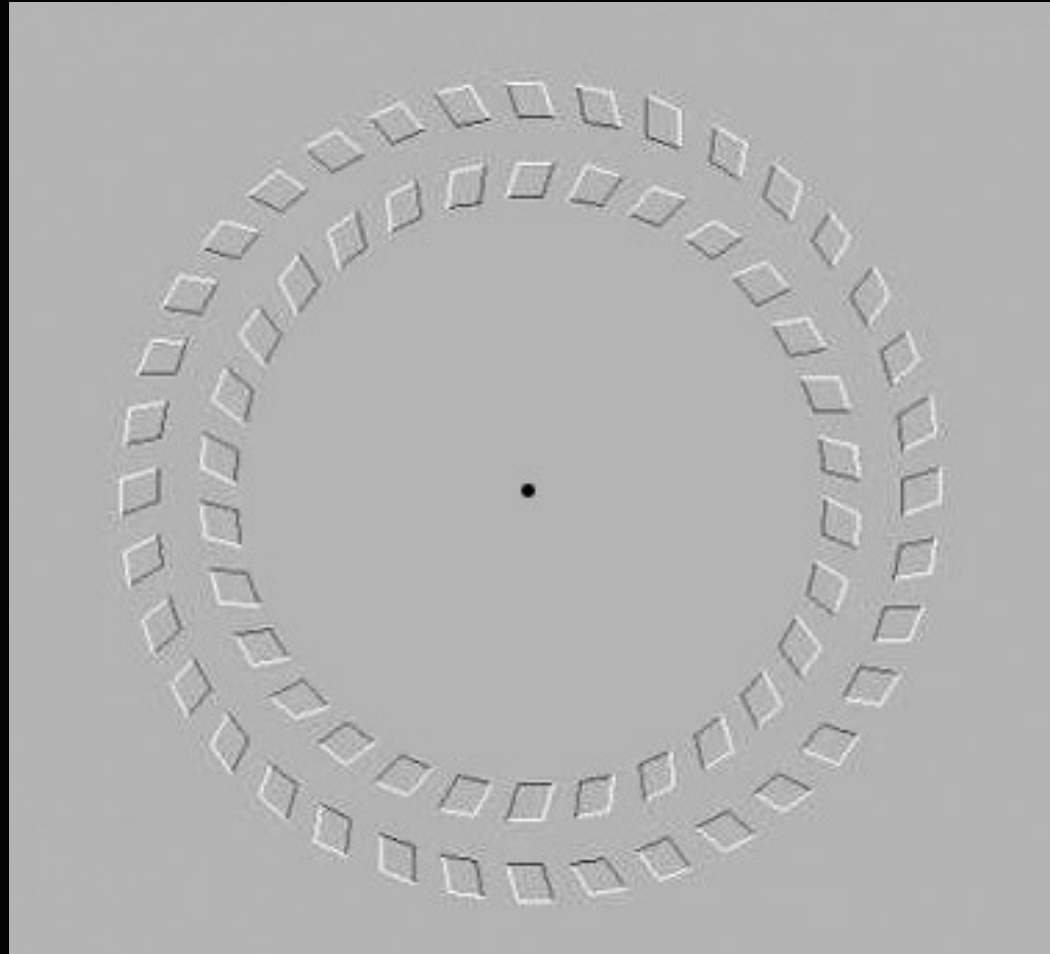# CS 182
Discussion Section
Leon Barrett

Announcements

- a3 part 2 due tomorrow, Feb. 22, 11:59pm

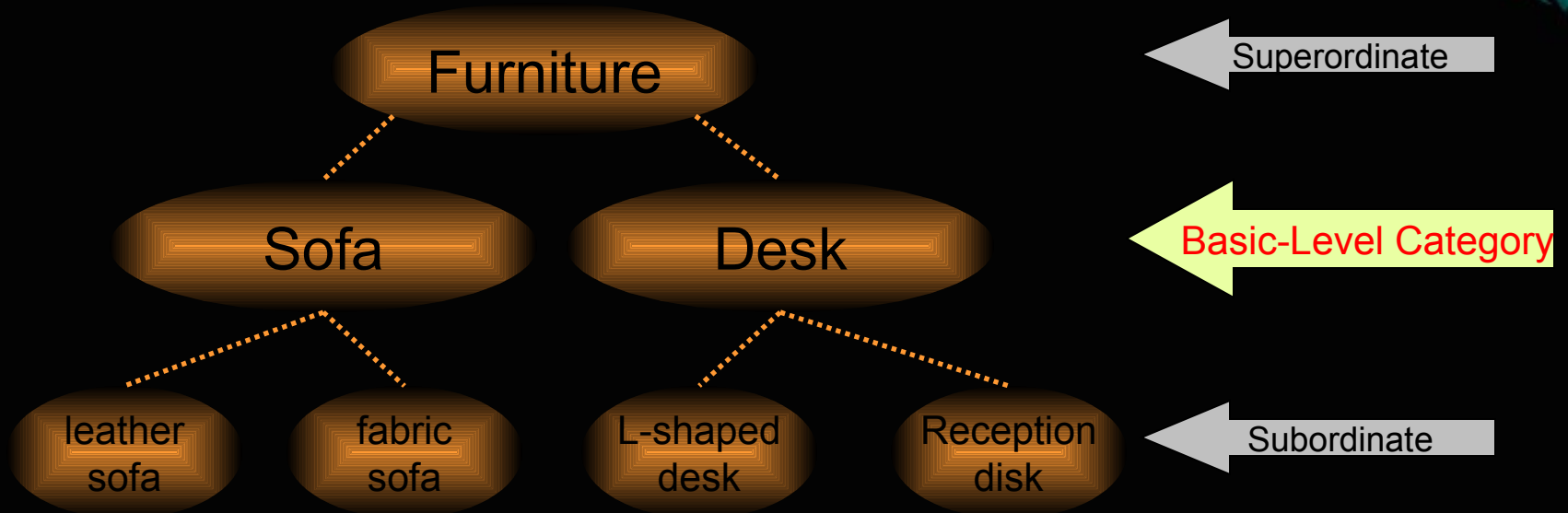- I still have some of your quizzes

- Homework questions?

Quick Recap

- Last Week
  - Finished up backprop and neural networks
  - Color: neurophysiology, psychophysics, etc.
- This Week
  - Categories & concepts
  - Linguistics guest speakers
- Coming up
  - Image Schemas, Force-Dynamics

Categories

- What constitutes a basic-level category? Is red a basic-level category? Is maroon?

- Does it vary from person to person?

- What is a superordinate category? A subordinate category?

Categories & Prototypes: Overview

Furniture

Superordinate

Sofa   Desk

Basic-Level Category

leather sofa   fabric sofa   L-shaped desk   Reception disk

Subordinate

- Three ways of examining the categories we form:
    - relations between categories (e.g. basic-level category)
    - internal category structure (e.g. radial category)
    - instances of category members (e.g. prototypes)

Basic-Level Category

What constitutes a basic-level category? Definition:

- Perception:
  - similar overall perceived shape
  - single mental image
  - (gestalt perception)
  - fast identification

- Function:
  - general motor program

- Communication:
  - shortest
  - most commonly used
  - contextually neutral
  - first to be learned by children
  - first to enter the lexicon

- Knowledge Organization:
  - most attributes of category members stored at this level

Red? yes   Maroon? arguable (expertise)

Category Structure

- Classical Category:
    - necessary and sufficient conditions
- Radial Category:
    - a central member branching out to less-central and non-central cases
    - degrees of membership, with extendable boundary
- Family Resemblance:
    - every family member looks like some other family member(s)
    - there is no one property common across all members (e.g. polysemy)
- Prototype-Based Category
- Essentially-Contested Category (Gallie, 1956) (e.g. democracy)
- Ad-hoc Category (e.g. things you can fit inside a shopping bag)
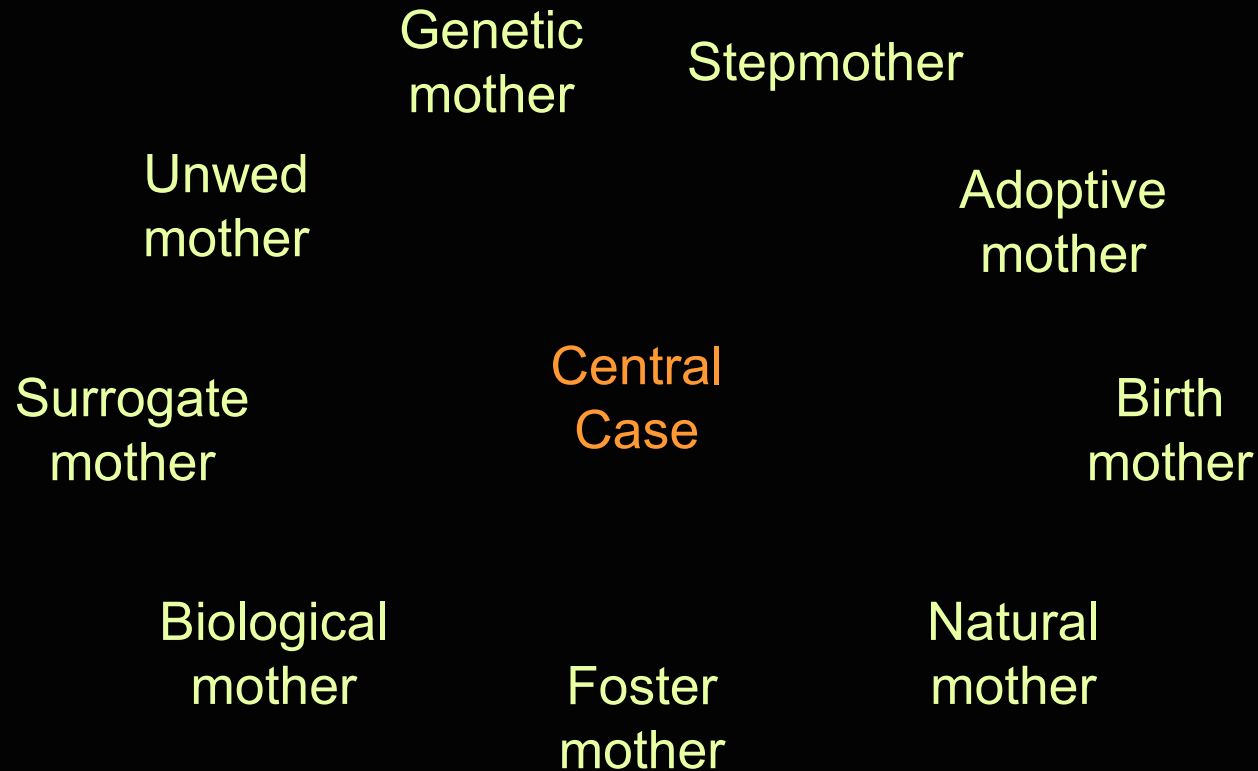
Prototype

- Cognitive reference point
  - standards of comparison
- Social stereotypes
  - snap judgments
  - defines cultural expectations
  - challengeable
- Typical case prototypes
  - default expectation
  - often used unconsciously in reasoning

- Ideal case / Nightmare case
  - e.g. ideal vacation
  - can be abstract
  - may be neither typical nor stereotypical
- Paragons / Anti-paragons
  - an individual member that exhibits the ideal
- Salient examples
  - e.g. 9/11 – terrorism act
- Generators
  - central member + rules
  - e.g. natural number = single-digit numbers + arithmetic

Mother

- **The birth model**

  The person who gives birth is the *mother*

- **The genetic model**

  The female who contributes the genetic material is the *mother*

- **The nurturance model**

  The female adult who nurtures and raises a child is the *mother* of the child

- **The marital model**

  The wife of the father is the *mother*

- **The genealogical model**

  The closest female ancestor is the *mother*

(WFDT Ch.4, p.74, p.83)

Radial Structure of Mother

Genetic mother   Stepmother

Unwed mother   Adoptive mother

Surrogate mother   Central Case   Birth mother

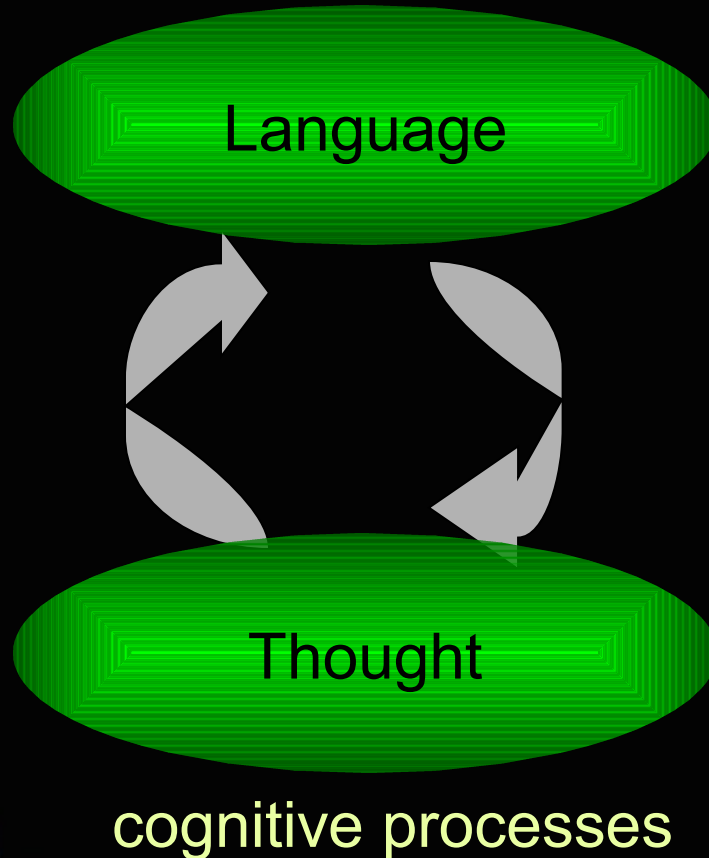Biological mother   Natural mother

Foster mother

The radial structure of this category is defined with respect to the different models

Marriage

- What is a marriage?

- What are the frames (or models) that go into defining a marriage?

- What are prototypes of marriage?

- What metaphors do we use to talk about marriages?

- Why is this a contested concept right now?

Language and Thought

Language

Thought

cognitive processes

- We know thought (our cognitive processes) constrains the way we learn and use language

- Does language also influence thought?

- Benjamin Whorf argues yes

- Psycholinguistics experiments have shown that linguistics categories influence thinking even in non-linguistics task
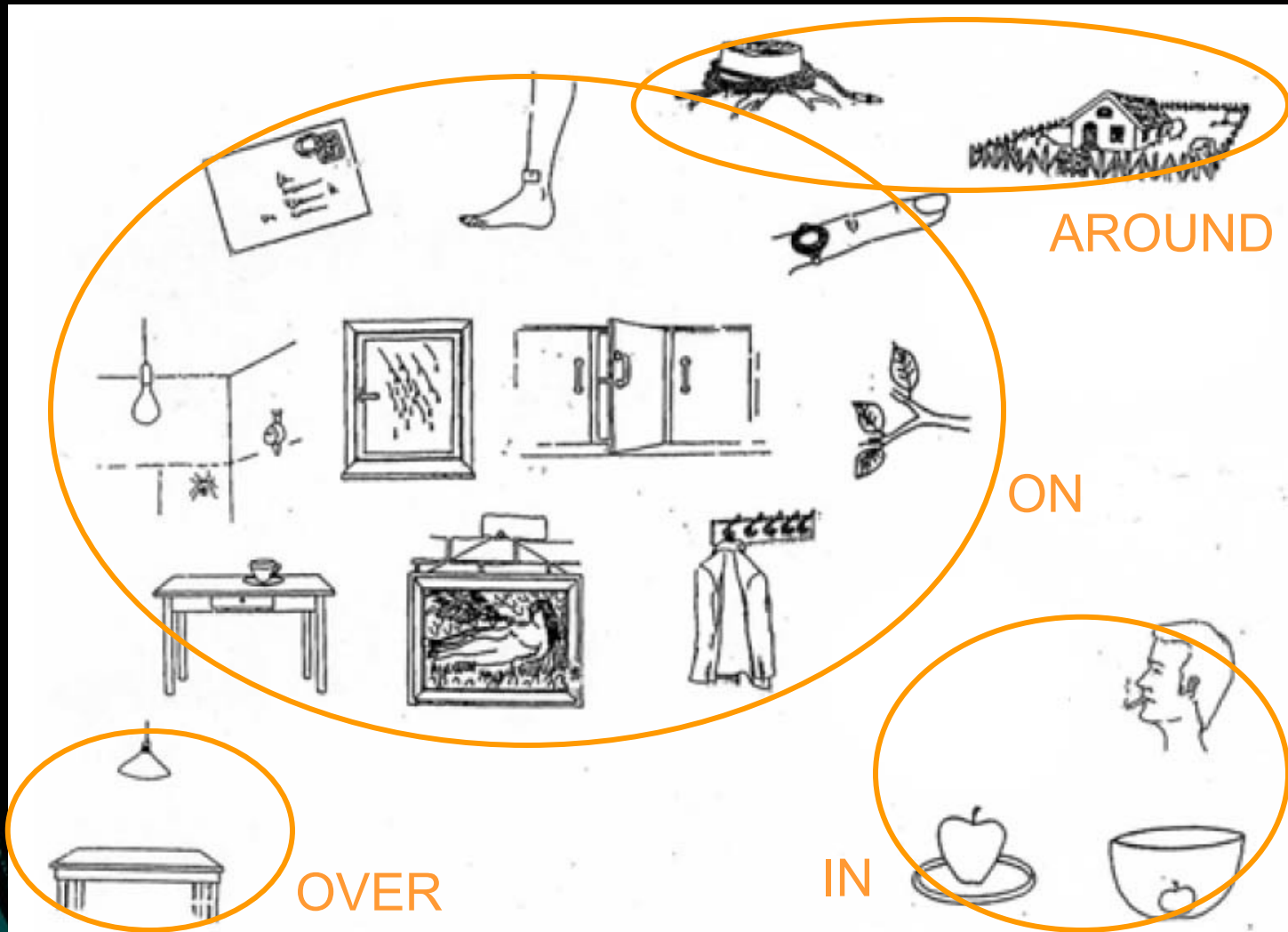
Image schemas

- What is a schema?
  - a pattern capturing structure in the world
- What is an image schema?
  - a schema about interaction with the world
- Can you name some?
  - Containment
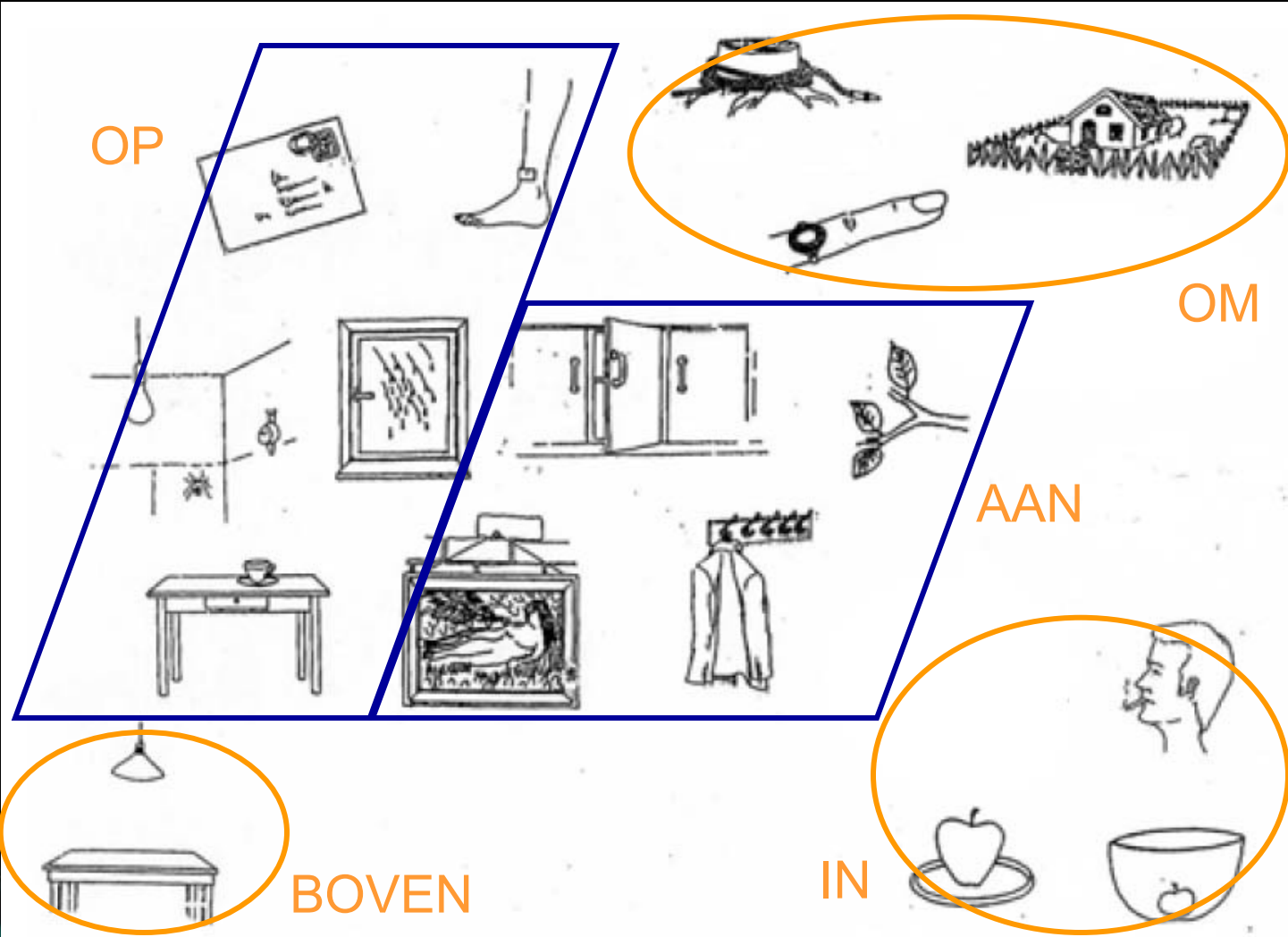 - Source-Path-Goal
  - Part-whole
  - Near-far

Image schemas

- Think of image schemas as the "basic categories" of interaction with world

- Image schemas have basis in interaction with world and with neural structures

  – Of course, neural structures should capture regularities in interaction with world

  – Not linked to a specific neural area
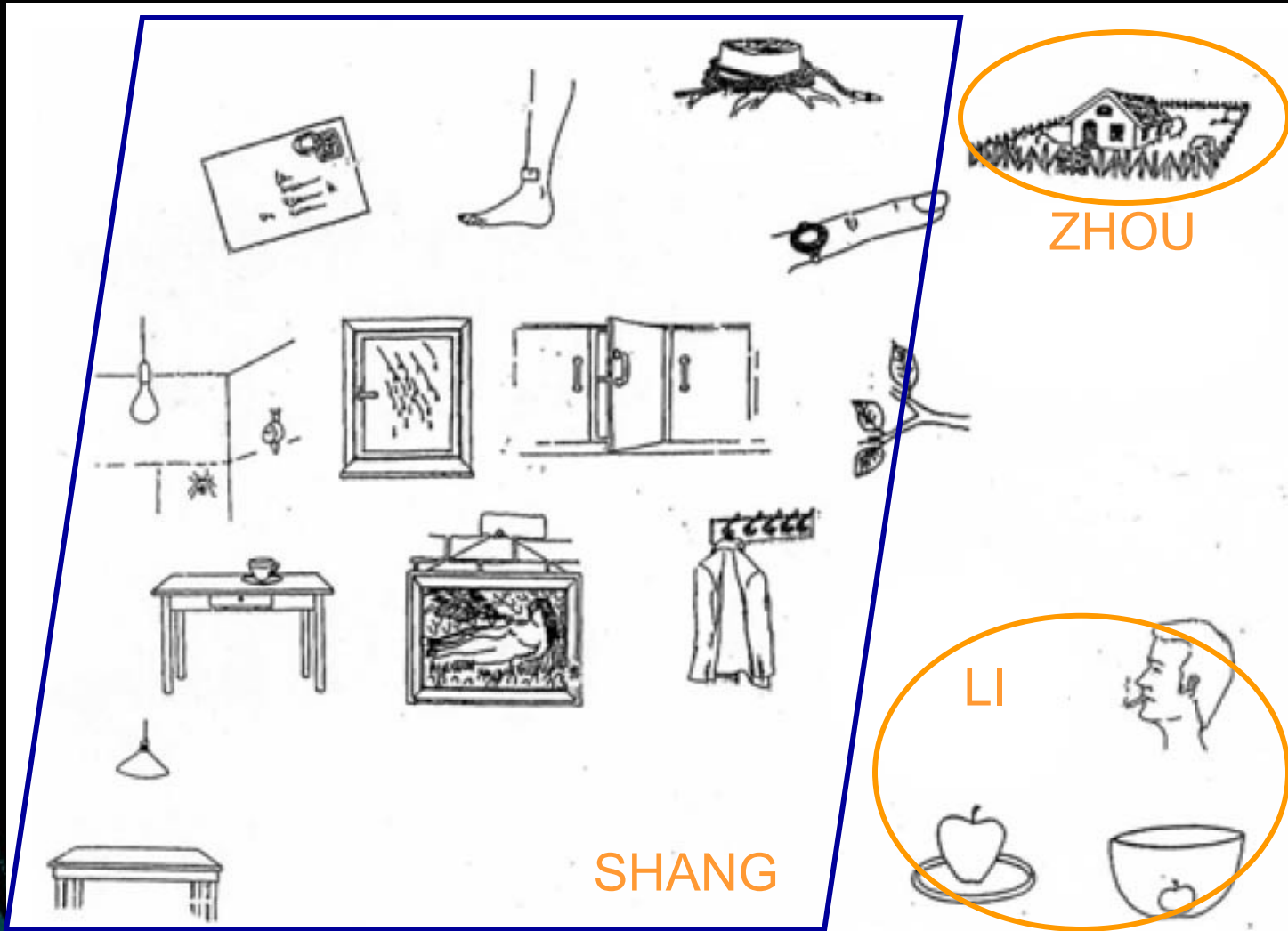
  – Instead, linked to a neural CIRCUIT

English

AROUND
ON
IN
OVER

Dutch

OP

OM

AAN

BOVEN

IN

Bowerman & Pederson

Chinese

ZHOU

SHANG

LI

Lakoff central concepts

- What is an effector?

- What do people mean by neural encoding?

- What are motor neurons?

- What are sensory neurons?

- What are mirror neurons?

- What does it mean that executing schemas are not representational and not symbolic?

- How are metaphors maps?

- What is aspect, in the context of action?