# 3. Psychology of concepts and categories

## Categories and categorical perception

Phenomenon in which people perceive stimuli from different categories as more different from each other than stimuli from within the same category.

**Audition**
When we hear speech, our brains are better at telling sounds apart if they belong to different categories than if they're just slight variations within the same category. We test this using **Voice Onset Time** (VOT), which is the tiny delay between a consonant sound starting and your vocal cords vibrating. This categorical perception helps us process speech quickly, and it's shaped by our experiences. Brain areas coding for low-level representations are not influenced by such categorization, while those coding for high-level representations are.

- **Change Deafness**
  We often don't notice a speaker's voice changing mid-conversation.
- **Sine-wave speech**
  Our expectations can make us "hear" speech in unusual sounds.
- **McGurk Effect**
  What we see (like a mouth moving) can change what we hear, showing that our brains combine sight and sound for speech.

**Vision**
In categorical perception for color, discrimination of items that cross category boundaries is faster and more accurate than when the items are within the same color category, who are spaced at the same distance. Color categories are not universal, and thus categorical perception depends on language.

## Conceptual structure

**Theory on words and concepts**
It is generally assumed that a single word corresponds to a single concept. But there is not a 1-to-1 mapping between form and meaning of words due to polysemy. The meaning of a word is given in the moment we say it, depending on the context (meaning extension). Different senses of polysemous words can be stored, as they observed priming effects when a word was used twice in the same sense, and interference effects when the sense was switched. So at the end, words are not concepts.

**Focusing on conceptual structure**
Concepts are studied by using words, assuming that words map onto conceptual knowledge and are a reasonable "proxy" for studying relations between concepts.

**Representing the meaning of concepts in the brain**
Our brains build a mental dictionary of concepts by using rules and features, and these rules can be learned automatically and don't always have to be rigid.

- **Propositional Networks**
  Our brains define concepts like "dog" by linking them to a general group (like "canine") and adding specific details. However, this idea has flaws: how often we hear something affects how fast we recognize it, , we're sometimes faster at recognizing broader categories than more specific ones.
- **Prototypes**
  Instead of strict definitions, a better idea is that we understand concepts based on a "prototype" – a typical example. This means categories have central members (the most typical) and less typical ones.
- **Fuzziness and Levels of Abstraction**
  Categories often don't have clear-cut boundaries. Also, we can think about things at different levels: a superordinate level (like "animal"), a basic level ("cat"), or a subordinate level ("Siamese cat"). We tend to use the "basic" level because it gives us enough information to be useful without being overly specific. This helps our brains be efficient.