CONCEPT LEARNING:

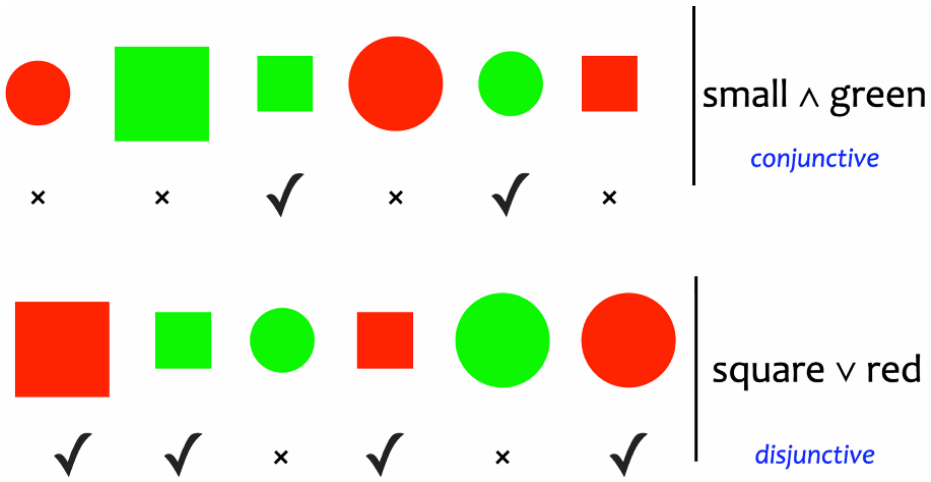
- **Deduction General and specific:**
  - All men are mortal
  - Socrates is a man
  - Socrates is a mortal

- Concept learning is essentially a guess.

- The experimenter teaches a “concept” to a subject, giving new positive and negative examples (wth feedback) until the subject learns successfully.

- A dependent measure is the number of trials (examples) required for successful learning.

- **Examples:**



- **Experimental Conclusions:**
  - Affirmation < Conjunction < Disjunction (inclusive) < Disjunction (exclusive).
  - Affirmation means only 1 feature involved to make a statement or condition positive.
  - Especially Conjunction < Disjunction.
  - This was seen as a very basic conclusion about learning.
  - It was assumed that “concepts” were defined logically.

- **Classical vs. Modern Views of Categories:**
    - In the classical view, categories are logical constructs and have definitions .
    - **Examples:**
        - A bachelor is an unmarried adult male person.
        - A triangle is a 3-sided geometric figure.
    - **A definition lists necessary and jointly sufficient features:**
        - Being unmarried is necessary, but not sufficient.
        - All 4 features are jointly sufficient
        - Bachelor < – > unmarried ^ adult ^ male ^ person
    - Classical categories have clear-cut boundaries.
    - Objects are either members or non-members of the category.
- **Fuzziness and family resemblance:**
    - Most mental categories have “fuzzy” boundaries.
    - Objects within them have a family resemblance but no clear definition.
    - **Examples:**
        - Game
        - Furniture
        - Bachelor (?)
- **Prototypes:**
    - Posner & Keele (1968) taught subjects artificial categories by providing examples with various degrees of distortion.
    - Subjects induce a “prototype” – a characteristic “normal” form.
    - Even when highly typical examples were withheld (called proto typification).
    - A prototype is an idealized abstraction of the purest form of the object being represented.
    - Eleanor Rosche (1973) studied color concepts in Dani people in Indonesia.
    - She concluded that concepts have “natural” central tendencies.

- **Example: The Bird Category:**
    - Turkey
    - Chicken
    - Robin
    - Sparrow
    - Eagle
    - Hawk
    - Penguin
    - Ostrich

    - Certain things can be weird for human categories like how penguins and ostrich are technically birds.

- **Prototype view:**
    - **The "prototype" (fuzzy, aka family-resemblance) view of human concepts:**
        - Mental concepts exhibit degrees of membership called **typicality**.

        - They are defined by their central tendencies called prototypes.

        - **EX:** birds usually have feathers, fly, lay eggs, sing, make nests, and live in trees.
            - However, none of these features are necessary or sufficient.

        - Category membership is determined by **similarity** to the prototype.

- **Even definitional categories act fuzzy:**
    - Armstrong tested very "definitional" categories like an odd number, female, grandmother.
        - Measured typicality ratings, RT to classify.

    - They found that **even these concepts** behave like fuzzy categories.

    - They argue however that definitions must be part of the meaning of certain concepts.

    - Instead, they propose distinguishing between **core meaning** and **identification procedures**.

- **Exemplar model:**
    - In 1979 an alternative version of the "fuzzy" view was introduced, called the Exemplar model.

- An exemplar model stores examples (called exemplars) to represent the “concept”

- Future instances are evaluated by comparison with the stored exemplars.

- X is a squirrel if it is more similar to stored examples of squirrels than it is to other stored exemplars.

- There is no generalization or abstraction.

- From about 1980 - 2010, much of the psychological literature centered on the battle between prototype models and exemplar models.

- **Similarity:**
  - Similarity plays a central role in both prototype theories and exemplar theories.

  - The similarity is very “subjective” because it can mean different things in different situations.
    - A bear vs a teddy bear
    - An apple vs a baseball
    - Time vs. a river

- **The Geometric Model of similarity:**
  - One view of similarity is that it is analogous to proximity in some mental space.
    - I.e. dissimilarity <-> distance

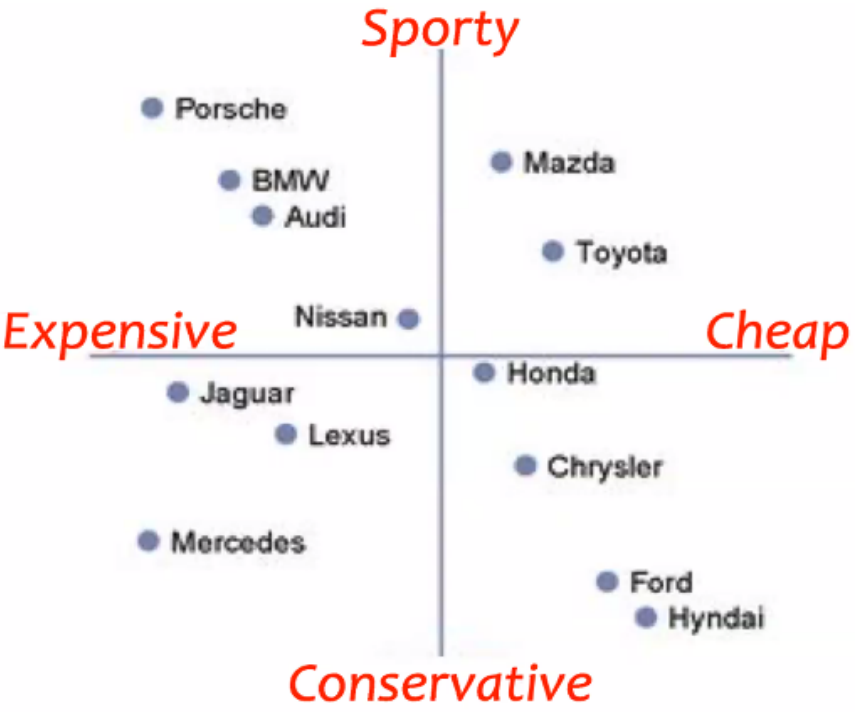
  - That is, mental representation of the perceptual features takes the form of a mental space analogous to a physical space.

  - **Multidimensional Scaling (MDS):**
    - A statistical technique for visualizing this space.

    - Given a set of items and judgments of dissimilarity among the items.

    - MDS finds positions in an imaginary space such that inter-item distances match judged dissimilarity as closely as possible.

    - Starting in about 1957, psychologists have plotted MDS spaces for thousands of types of items.



- MDS is used to reconstruct the corresponding distances in the mental space shown above.