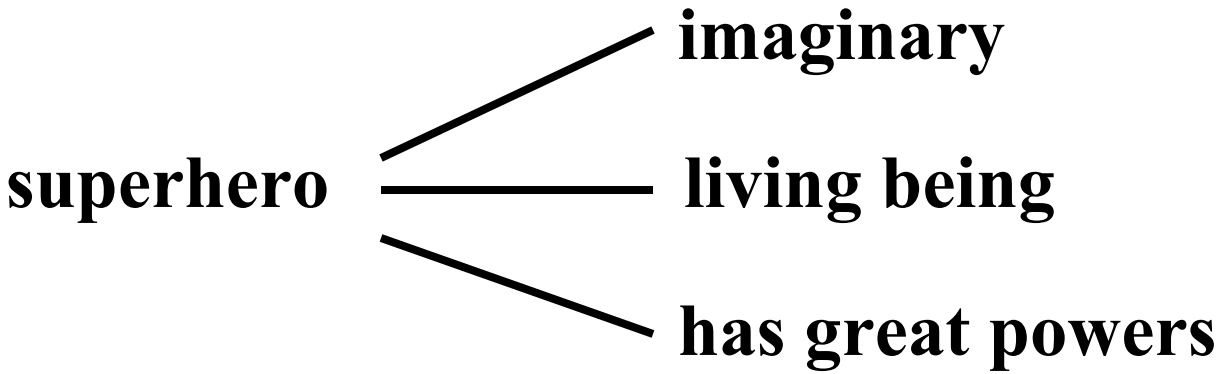
# Conceptual Development

- **Concepts involve grouping together different entities on the basis of some similarity**
- **Concepts allow us to organize our experience into coherent patterns and to draw inferences in situations in which we lack direct experience**
- **Concepts also save us mental effort, by allowing us apply previous knowledge to new situations**

# How Do People Represent Concepts?

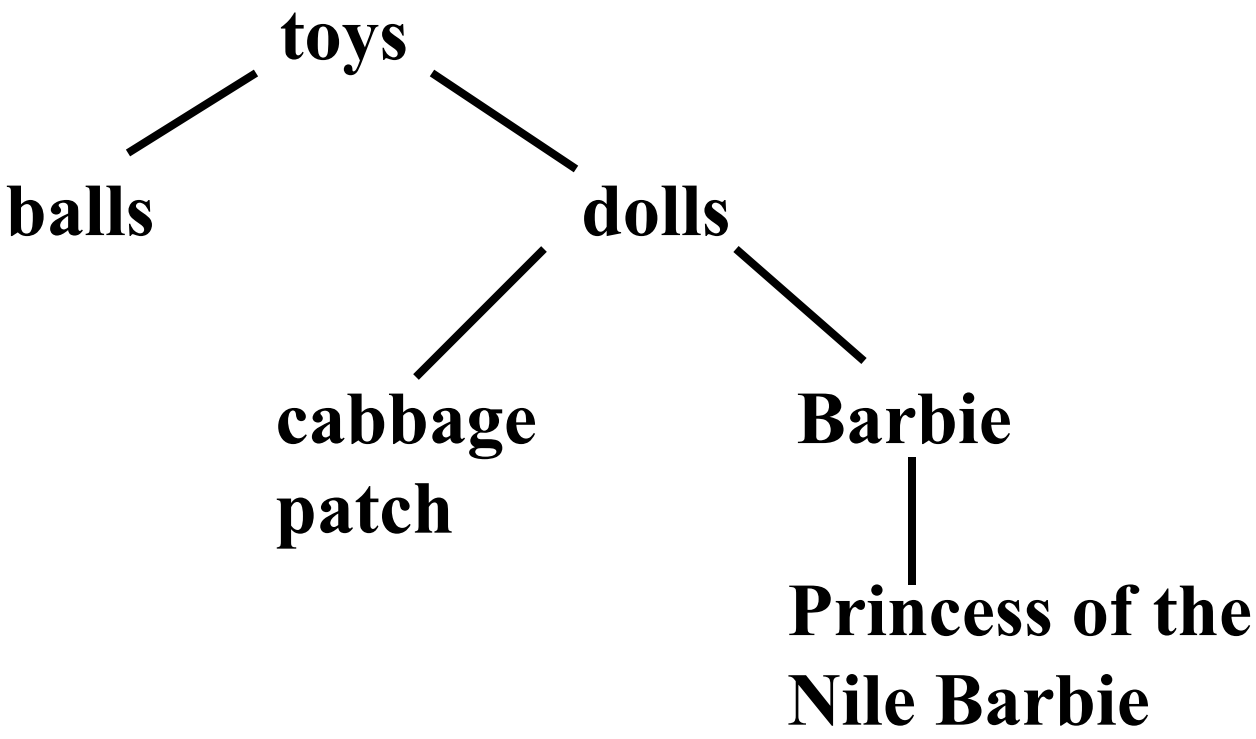
**<u>Defining Features Representation</u>: Define concepts in terms of a few necessary and sufficient properties**




***"All examples are equally good"***

# How Do People Represent Concepts?

**<u>Defining Features Representation</u>: Concepts are organized hierarchically**



# Do Children's Concepts Differ From Adult Concepts?

## Representational Development Hypothesis

**If young children's minds differ fundamentally from the minds of older children or adults, then their concepts also differ**

- **more concrete**
- **perceptually based**
- **incomplete superordinate groupings**

# Organization of Children's Concepts Across Age

**How are these alike?**

**1) banana, peach, potato, meat, milk, water, air germs**

**2) bell, horn, telephone, radio, newspaper, book, painting, education**

***1st Stage – Thematic Groupings (6 yr olds)***

**"The little boy was eating a banana on the way to the store to buy peaches and potatoes."**

# Organization of Children's Concepts Across Age

***2nd Stage – Chain Concepts (7-8 year olds)***

***collections*** **– mention same feature, but different for each item**

**"bell is black, horn is brown, radio is red"**

***key rings*** **– taking an item and linking all others to it**

**"germs are in banana, peach, potato, etc."**

***edge matchings*** **– associative links**

**"banana & peach are both yellow, peach & potato are round, potato & meat are served together"**

# Organization of Children's Concepts Across Age

***3rd Stage – Superordinate Concepts (9-11 yr olds)***

**"things that make noise"**

**"all are food"**

**"all have skins"**

**6 yrs – 50% superordinate**

**9 yrs – 75% superordinate**

**11 yrs – 95% superordinate**

# Children's Concepts: Changing Basis of Organization with Age

**<u>Task:</u> ask the child to group together items that belong from an array of pictures of familiar objects**

***Perceptual features first (6 yrs old)***

**"the barn and apple go together because they are both red"**

**"the clock and ruler go together because they both have numbers on them**

# Children's Concepts: Changing Basis of Organization with Age

***Functional features next (8 yrs old)***

**"the radio and oven go together because you turn them both on"**

**"the hammer and nail go together because you hit the nail with the hammer"**

***Finally, superordinate groupings (10 yrs old)***

**"they are all food (or toys, or clothes, etc.)**

# How Do People Represent Concepts?

**Probabilistic Representation: Most concepts are represented in terms of probabilistic relations between the concept and various features.**

**Knowing that an object has four legs, can be sat on, and is made of wood, makes it likely that object is a chair, but does not guarantee it.**

# Probabilistic Representations

**<u>Cue Validities:</u> presence of feature increases the likelihood it's a member of a concept**

**e.g., has gills (fish?)**

**sit on it (chair?)**

**red (apple?)**

**Mistakes can be made based on common features**

**e.g., a bat is a bird**

**dolphins are fish**

# Probabilistic Representations

**<u>Basic Level Categories:</u> given that you have a hierarchical organization of concepts, one level will provide the greatest discriminability**

**furniture – <u>chair</u> – kitchen chair**

**animal – <u>bird</u> – canary**

**vehicle – <u>car</u> – Saab**

***Note:*** **children learn basic categories first**

# Probabilistic Representations

**Correlated Features:** features of natural objects tent to cluster together (are correlated)

e.g., things that bark, also tend to have four legs, a tail, a wet nose, sharp teeth and fur

**Prototypes:** There are more representative instances of a concept, these instances have high cue validities

e.g., a robin flies, builds a nest in a tree, has a bird song, is a typical bird size

a penguin has none of these features

# How Do People Represent Concepts?

**<u>Theory-Based Representation</u>: There is more to concepts than correlations among features or defining features. Concepts also embody theoretical beliefs about the world and the relations of entities to each other.**

**"What concept has the following members: children, portable TVs, jewelry, and photo albums?"**

**answer: the things we would take out first from a burning home**

# Theory-Based Representations

**Theoretical beliefs about the world influence our reactions to new information.**

***e.g., "Today I saw a car with orange wheels"***

**situation is novel, but not implausible**

**We might imagine the owner is a prankster or hippie, & the whole car may be brightly painted.**

***e.g., "Today I saw a car with square wheels"***

**situation is novel, but also implausible**

**We infer it cannot move, that is was not supposed to move, perhaps it's a sculpture.**

# Theory-Based Representations

**Most concepts are partial theories, that include explanations that include causal relations.**

***e.g., "Why do yaks have four legs rather than three or five"***

**A child might respond by noting that four legs can be moved in pairs, which allows yaks to run relatively quickly and still maintain their balance.**

**The child also uses her knowledge about animals in general to produce an explanation.**

# Theory-Based Representations

**<u>Core Theories:</u> Although children may general many informal theories, a few "core theories" are especially important.**

***Naïve physics* – concerning inanimate objects**

***Naïve biology* - concerning living things**

***Naïve psychology* – concerning the human mind**

**Note: each theory focuses on different types of causal relations, consider how you answer the question "Why did X move?" if it's a pebble, a bird, or a person.**

# What Can We Conclude About Children's Conceptual Representations

- **Children from a very early age use all three types of conceptual representations**
- **The prominence of different types of conceptual changes with understanding/age. Early on children may rely on probabilistic concepts**
- **Theory-based representations may form later for some concepts, with defining feature representations developing last**