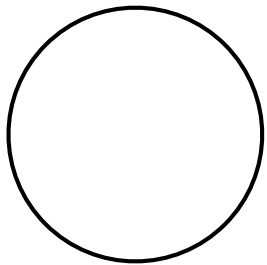


Shape and shape recognition

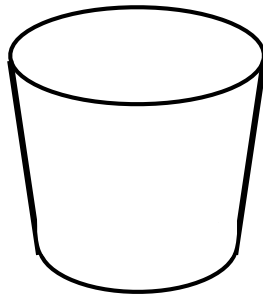


Shapes with the same label (“chair”) differ enormously

When viewpoint changes, appearance can change radically

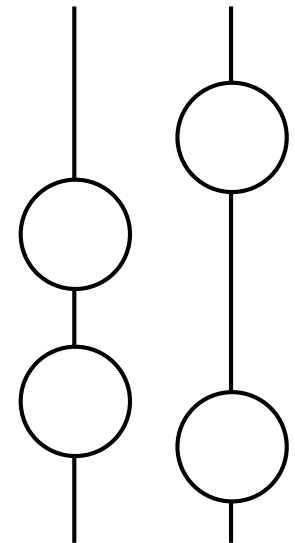


What is this?



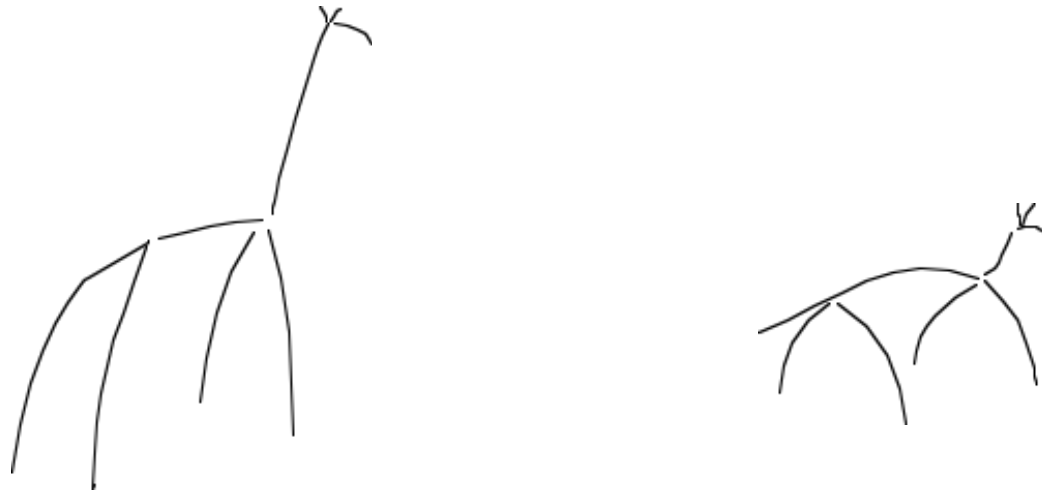
Canonic view

A viewpoint from which an object is readily recognizable



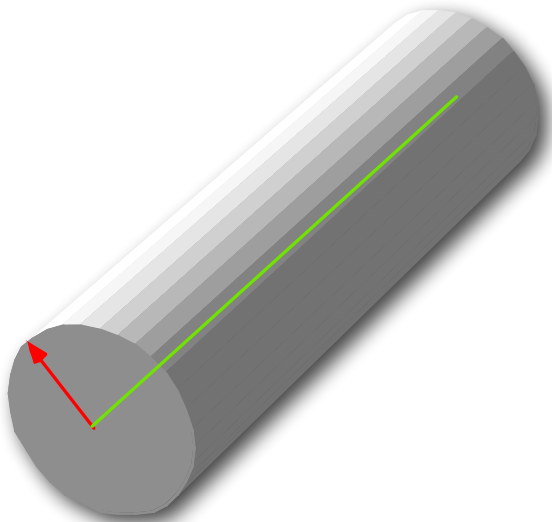
Panda climbing tree

- Axial and part-based representations are critical (Marr & Nishihara, 1978)



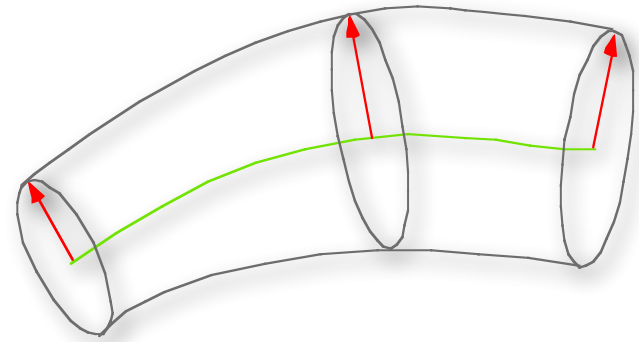
You can recognize these pipe-cleaner “animals” even though they differ from the originals in contour, color, texture, etc.

Generalized cylinders



Cylinder

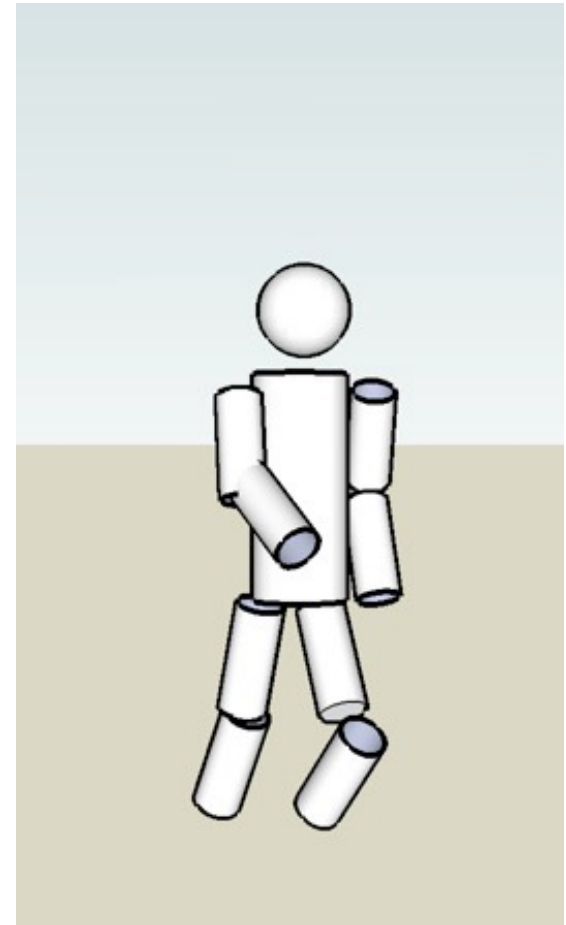
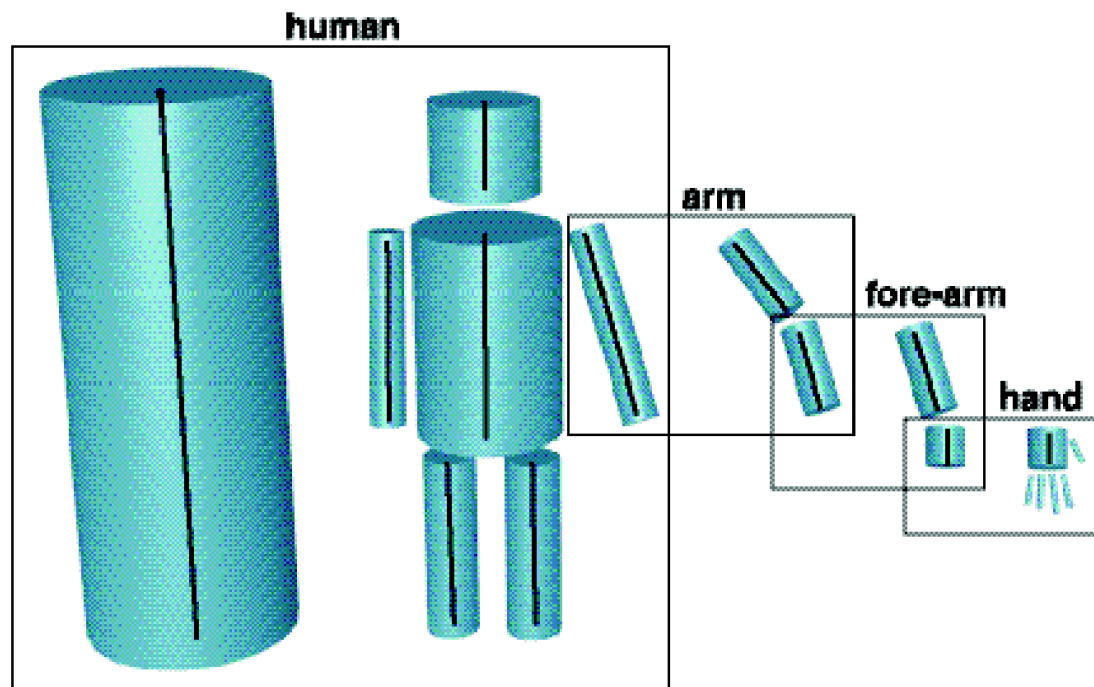
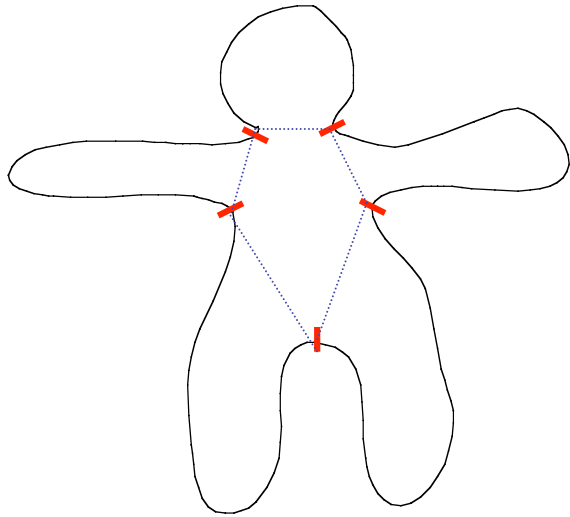
- axis (= straight line)
- radius (= constant)



Generalized cylinder

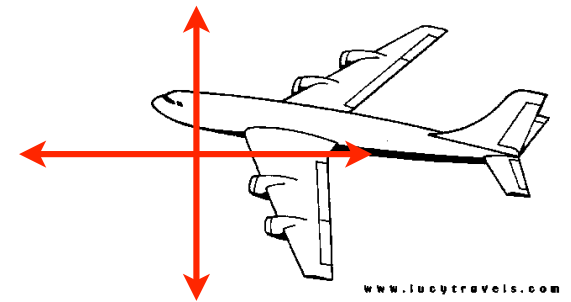
- axis (= space curve)
- radius (= variable function)

Parts at multiple scales



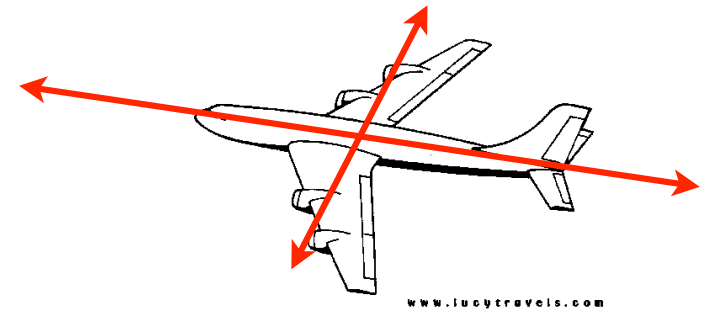
How does the brain achieve shape constancy — and does it?

Viewer-centered coordinate system
(The tail is to the right of the wings)
→ implies viewpoint dependence



VS.

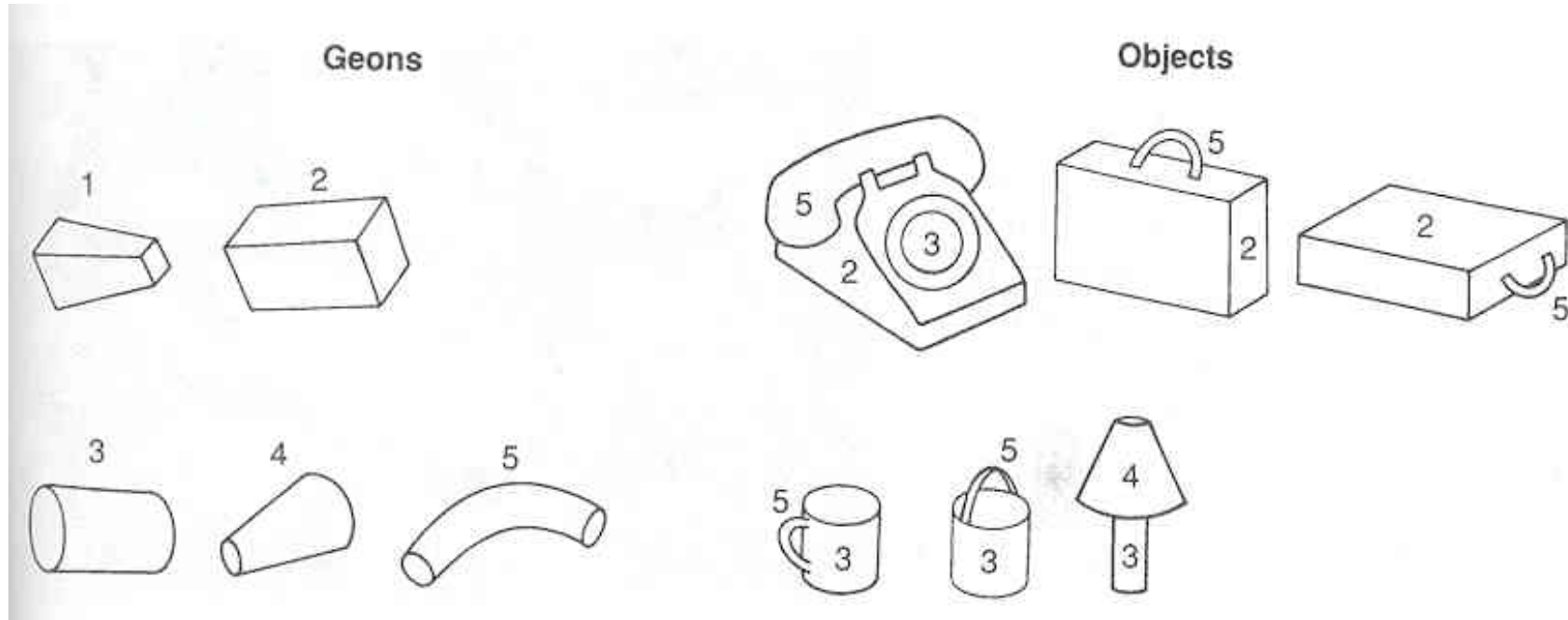
Object-centered coordinate system
(The tail is at the rear of the body)
→ implies viewpoint independence



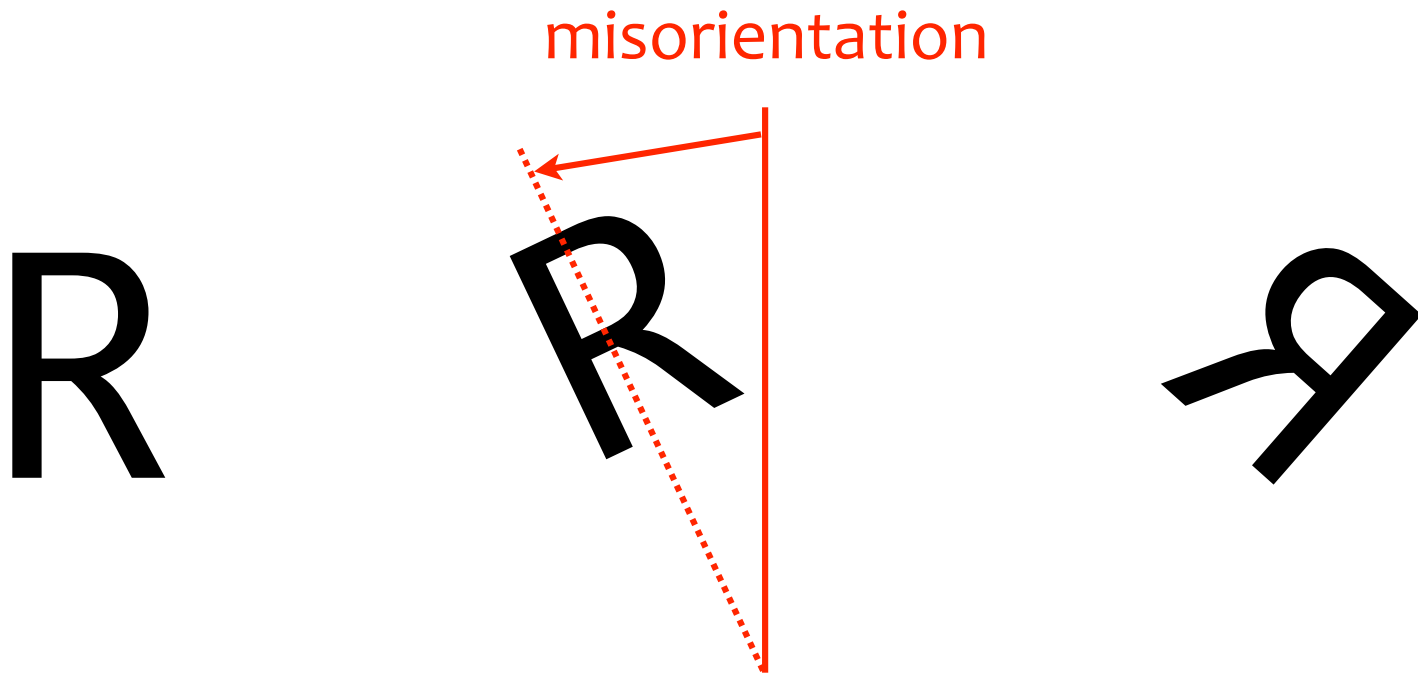
Recognition by Components (1987)

Geons (=“geometric ions”)

Individual part types that are combined in various ways to form unique 3D object models



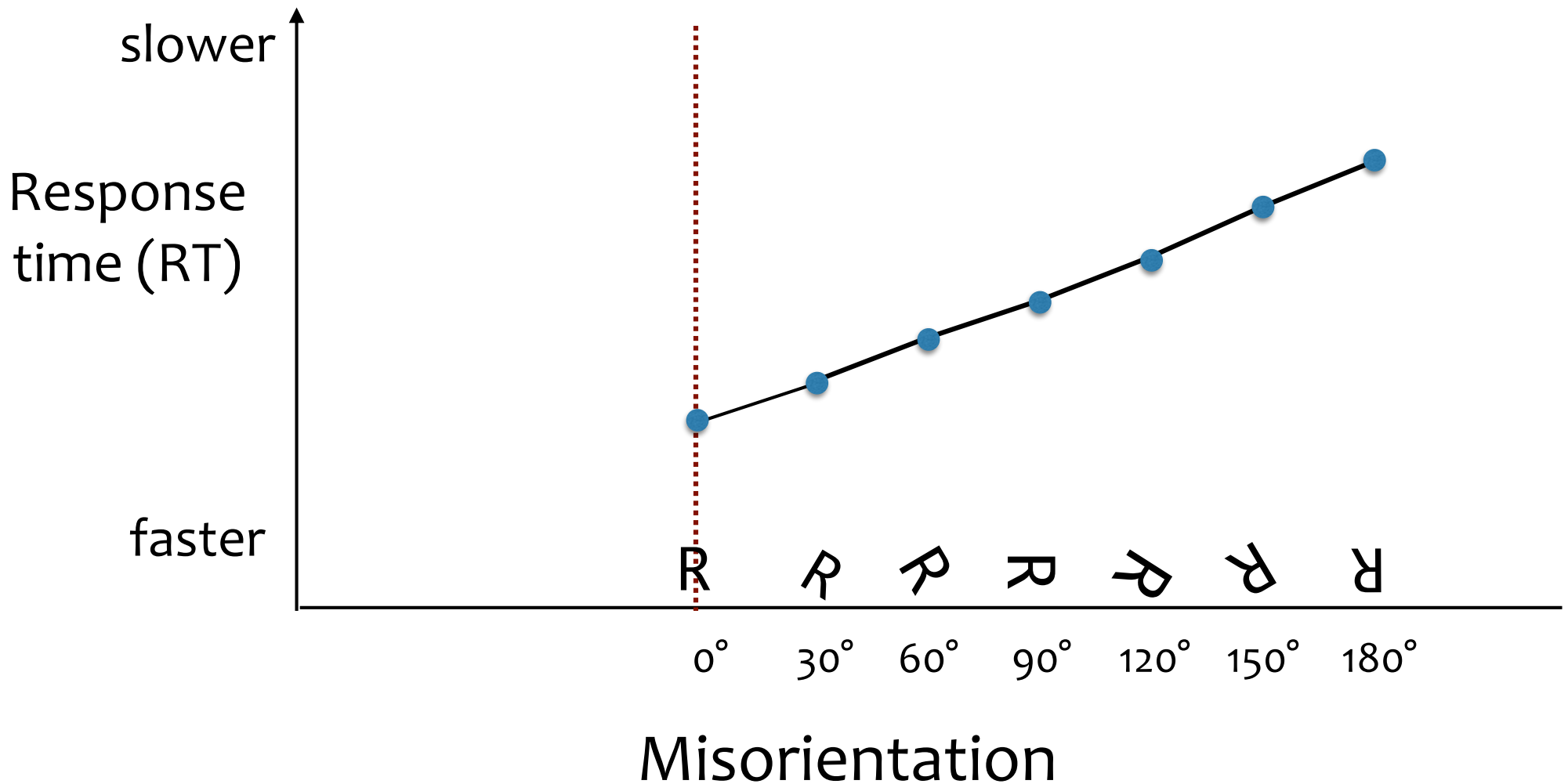
Viewpoint dependence



Does recognition depend on (mis)orientation?

“Mental rotation”

learned or standard orientation



Object recognition is **viewpoint-dependent**