

Perception-Based Representation

General Importance of Representation

determination of actions is not just current inputs

capture of information in environment:

what is not captured

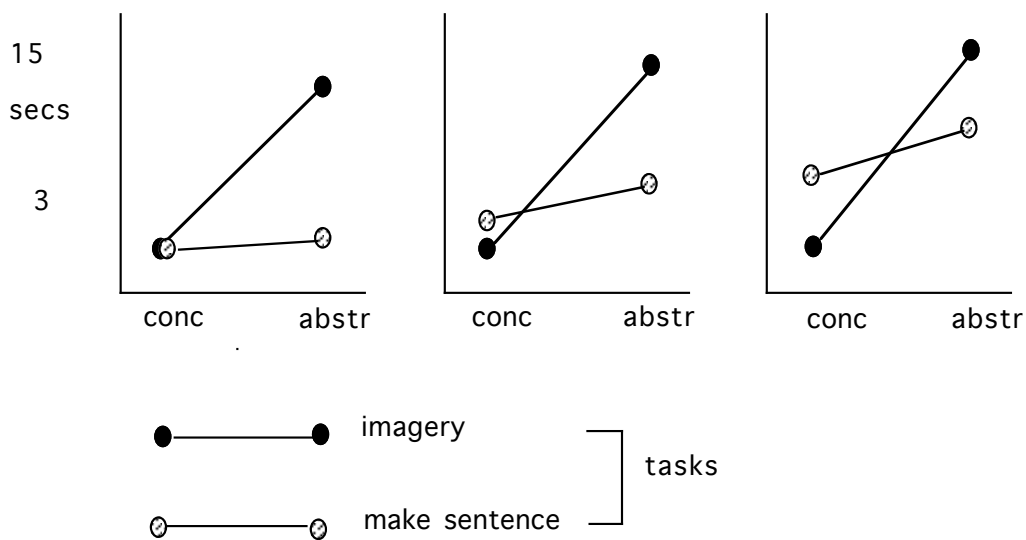
is not available for appropriate action

Dual Coding Hypothesis, Paivio, 1971

Paivio- Dual Coding

serial vs parallel

abstract vs concrete



Santa 1977

related demonstration of visual vs. verbal

Roland & Friberg, 1985

physiological evidence

rehearse words vs. spatial path

different areas of brain activation

Visual and Spatial Imagery:
nature of processing on...

Mental Rotation

Shepard & Metzler, 1971
RT is a linear function of degrees rotated

Interference Effects:

Brooks, 1968
scanning diagrams vs. sentences
different kinds of responses

stimulus	pointing	tapping	vocal
diagrams	28.2	14.1	11.3
sentences	9.8	7.8	13.8

interference is spatial rather than visual

use tactile pointing

Baddeley & Lieberman, 1976
letter image task +
brightness judgement
blinded pendulum following

Mental Comparisons

Moyer, 1973

Kosslyn CRT Model
visual sketchpad has finite size and granularity
-> implications

Nature of Perception Based Representation

Spatial vs. Visual Information

spatial - cross modal

parietal lobe

visual - (e.g., color) unique to visual modality

temporal lobe (also object details)

Farah et al. 1985 / 1988

subject with bilateral temporal damage

-> problems with imagery tasks

judgements of color, size, lengths, shapes

no problems with spatial tasks

mental rotation, image scanning,

letter scanning, judgments of relative positions

parietal damage

-> problems with locations

Visual Images vs. Visual Perception

Finke et al. 1989

manipulation of mental images

Wallace 1984

imaginary illusions (Ponzo illusion)

Chambers & Reisberg 1985

reversible images

show briefly -> one interpretation

ask for other -> can't

draw figure -> can

Peterson et al. 1992

instructions help subjects do it

Hierarchical Structure of Images

Reed 1974

- parts of figures are not arbitrary
- images are structured
- chunks

cognitive maps

- Stevens & Coupe 1978 distortions