Object Recognition and Concept Formation

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Visual Field Defects
Visual Field Deficits

INTACT VISION

Both left- and right-eye visual fields are normal.
Patterns of visual loss

- Scotomas
- Central vision
- Peripheral vision
- Symmetry/congruity change as information nears cortex
Visual Field Deficits

Relatively small visual field deficits are called *scotomas*, while large ones are called *anopsias*. Deficits in vision resulting from a single lesion can either be *homonymous* or *nonhomonymous*, i.e., affecting the same or different parts of the two eyes’ visual field.

- Scotoma
- Nonhomonymous anopala
- Homonymous anopala
Centrocecal scotomas
Visual Field Deficits

[Diagram of brain with visual field deficits labeled]

Left eye visual field
Left eye retina
Right eye visual field
Right eye retina
Visual Field Deficits

Cut at level $G^1$

A lesion of the right visual cortex causes a complete loss of vision in the left hemifield: *contralateral hemianopsia.*
Visual Field Deficits

Left eye visual field

Right eye visual field

nasal

temporal

Left eye retina

Right eye retina
Visual Field Deficits

Cut at level B

A lesion of the optic chiasm causes a loss of vision in the temporal half of both visual fields: bitemporal hemianopsia.
Visual Field Deficits

Left eye visual field
Right eye visual field

Left eye retina
Right eye retina
A lesion of the right optic radiation just after the LGN also causes a loss of vision in the left hemifield: *contralateral hemianopsia.*
Visual Field Deficits
Visual Field Deficits

A lesion of the right optic nerve causes a total loss of vision in the right eye; it also produces a right afferent pupil deficit.
Visual Field Deficits
A lesion of the right optic tract causes a complete loss of vision in the left hemifield: contralateral hemianopsia.
Visual Field Deficits

Left eye visual field

Right eye visual field

Left eye retina

Right eye retina
Visual Field Deficits

Cut at level E

A lesion of the right optic radiation specific to Meyer's loop causes a loss of vision in the upper quadrant of the left hemifield. The same is true for lesions to the lower bank of the calcarine sulcus.
Visual Field Deficits
A lesion of the parietal portion of the right optic radiation causes a loss of vision in the lower quadrant of the left hemifield. The same is true for lesions to the upper bank of the calcarine sulcus.
Visual Field Deficits

Left eye visual field

Right eye visual field

Left eye retina

Right eye retina
Visual Field Deficits

Cut at levels $G^1$ & $G^2$

A lesion of both visual cortices causes a complete blindness.
Visual Field Deficits
Lesions to visual cortex are usually only partial and spare foveal vision, probably because the foveal representation is so extensive that a single lesion is unlikely to destroy it all.
Object Recognition
Object Token

Structural Description
Object Token

Object Type

Structural Description
Object Token

Structured Description

Object Type

Category Representation

Emotional/Motivational Representation

Action-Centered Description

VENTRAL Occipito-temporal Pathway

Structural Description
Connections with Amgdala

Object Token

Structural Description

Action-Centered Type Description

Object

Emotional/Motivational Representation

Category Representation
Object Token

Object Type

Category Representation

Emotional/Motivational Representation

Action-Centered Description

DORSAL Occipito-temporal Pathway

Structural Description
Titchener size illusion
Object Recognition

• Systematic patterning of the retinal image
Object Recognition

• Systematic patterning of the retinal image
  – Most important is shape
Object Recognition

• Systematic patterning of the retinal image
  – Most important is shape

• Speed of object recognition
  – IT cortex
Object Recognition

- Systematic patterning of the retinal image
  - Most important is shape
- Speed of object recognition
  - IT cortex
- Object tokens + attention/awareness
Object Recognition

• Systematic patterning of the retinal image
  – Most important is shape
• Speed of object recognition
  – IT cortex
• Object tokens + attention/awareness
• Object type