1. Types of damage

to eyes - injury, disease, cataracts
to optic nerve - injury, disease
to cortex - injury, disease, stroke, CO

2. Visual Agnosia

damage to ventral pathway
cortical blindness or mind blindness
cannot recognize objects, usually
cannot recognize faces either
e.g., patient DF cannot recognize objects or even report orientation

Brain Damage

1. Types of damage
2. Agnosia
3. Prosopagnosia
4. Neglect

What can we learn from pathology?

Human cost, benefit to patient
Specificity of damage -- brain imaging
Localizing from loss of function
Serial hierarchy vs parallel pathways

may include distortion of patterns, like DF’s case
or just inability to integrate, recognize or name
objects which are clearly seen
in both cases, patient may make appropriate motor
responses to the object (dorsal pathway)
occasionally, just recognition of faces affected
(prosopagnosia, Pauline)
or spared (CK)
typically permanent
Patient can see details but cannot name objects or describe their function. But makes appropriate gestures with his hands.

Object recognition
Lateral occipital cortex
fMRI shows activity here when performing object recognition tasks.
Damage here leads to object recognition problems: visual agnosia.

inability to integrate parts of object in order to recognize or name it
Sometimes can use distinctive features to recognize whole
High contrast images often used as test for loss of integration

Visual Search
visual agnosic often good at individual features
bad at combinations
no worse than normals with mixed distractors

Easy for normal
Easy for agnosic
Hard for normal
Hard for both

3. Prosopagnosia
Can see details but can’t recognize familiar faces
Can tell a face from a nonface
Emotion recognition can be spared
Recognize friends from voice, gait, hair style, etc.

The Man Who Mistook His Wife for a Hat
Intelligence, musical abilities unaffected
Gradual onset from tumor (or degenerative disease of visual areas)
Problems with object and face recognition
Recognize friends from features, voice, gait, hair style, etc.
**Congenital Prosopagnosics**

Do not recognize friends, family, self. This bothers friends a great deal.

I was about 12YO, and I was walking down an aisle that had columns covered with mirrors (I have a LOT of trouble with mirrors). I saw a girl walking toward me, and I thought to myself, "Boy, is SHE ugly!" You can imagine how depressed I was when I realized it was me!

Yesterday I went to pick my youngest son up from daycare. I did not recognize him, and I did not know who he was. I recognized him by his clothing.

**Why a face area?**

Need to recognize individual faces  
Only need to identify the category of objects  
This is a beet or this a lobster  
But not an individual beet or a specific lobster

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**Face recognition**

Ventral temporal cortex: fusiform face area (FFA)  
fMRI shows activity here when performing face recognition tasks  
Damage here leads to face recognition problems - prosopagnosia

**Can lose object recognition but spare face recognition**

agnosia without prosopagnosia  
CK head injury at age 17 while jogging  
normal visual acuity, language, reasoning  
draws well but can't identify later  
can't identify food in cafeteria  
large toy soldier collection as a child

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**Normals**  
66%  
71%

**CK**  
68%  
14%
Video of CK

4. Neglect:
loss of attention or awareness to contralesional side
damage to dorsal pathway (parietal lobes)
difficulty in moving attention around in that field
especially if competing item in good field
bisection task, clock task

4. Neglect: deficits for left side of world
left side of objects (at any location)
left side of visual field
left side of imagery
left side of dinner
typically temporary
sometimes deny any
loss
implication for logic
of thought?

Artist’s self portraits as he recovers from neglect

Artist sees these as normal and complete drawings
Imagery and neglect

Balint's Syndrome
loss of attention or awareness to both sides
damage to both parietal lobes
report only one object at a time
eyes never move
typically temporary

Balint's Syndrome

Summary
Types of damage
Agnosia
Prosopagnosia
Neglect
1 Minute Quiz
Monday - finals for
Observation paper prizes

Glossary
Agnosia: loss of object recognition
Prosopagnosia: loss of face recognition
Congenital prosopagnosia: lost since birth
Double dissociation: two deficits that are lost independently
Neglect: inability to move attention to one side of space
Balint's syndrome: inability to move attention to either side