- Faces -
A Special Problem of Object Recognition
Lesson II: Perception
module 10

Why are faces interesting?

- A face provides some of the most important cues about someone's identity
- Facial expressions contain strong social cues about the cognitive and emotional state of another person
- Examples of the importance of face perception in daily life:
  - Suspect identification via arrest warrants ("dead or alive") and composite sketch artistry
  - Security systems using face recognition as access control
- Prime example of objects with similar global structure but important detail variations

Prosopagnosia

- Prosopagnosia - the inability to recognize faces
  - Rare disorder
  - Not very well researched
  - Mainly due to lesions (stroke, accident) in right occipito-temporal cortex
  - Other visual recognition and discrimination performance not necessarily impaired
  - Highly specific: One patient was unable to recognize human faces but learned to identify sheep based on photographs of their faces (Metelli & Warrington, 1995)
- The existence of this highly-specific disorder suggests that there is a specialized brain module separate from general object recognition that serves the purpose of face recognition
Images of a prosopagnostic

- These are images provided by a prosopagnostic patient to illustrate her deficit
  - You can visit her web-site at www.prosopagnosia.com

Recognizing inverted faces

- Try to figure out what is strange about my face
  - This phenomenon has been titled "Thatcher"-illusion because the first example was a picture of the British prime minister who was not known to be a warm person

- I hope that you can make out the difference now ...
We are all aware that recognizing objects from unusual points of view is harder (see previous module)
- This seems to be even more pronounced for faces
- Suggests that the face-recognition module is highly orientation dependent
- Features and relations within the face that we are otherwise keenly aware of seem useless for inverted faces
- In the last example, my nose is extended, the ears are in the wrong position, and my eyes and my mouth have been inverted within the face...

Who are these two politicians?

Internal vs. external facial features

- Feature theories of facial processing often assume a detailed list of fine-grained facial features to identify a face
  - Is compelling, because we are sensitive to minute changes in facial expressions
- Sinha and Poggio (2001) disagree: External facial features (head shape, hair line, glasses, etc.) are important for face recognition
  - Dick Cheney’s face has George Bush’s internal facial features (check the mouth, eyes, and nose)
- This is especially important for low-resolution images or for faces seen from afar
Eyewitnesses in the court room have been found less reliable when identifying people of their own race than people from a different race.

Expose hypothesis
- One explanation of this deficit claims that less experience with faces from the other race as reason.

Salient feature hypothesis
- A second approach assumes that observers classify the visual information differently.
- Category prototypes are used, instead of the features differentiating within a category.
- The ability of observers to be able to recognize differences in cross-race faces when put side by side favors this view.