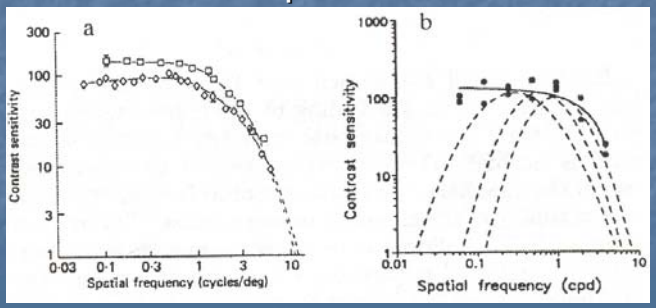
SPATIAL VISION

ICS 280: Visual Perception

Chromatic Contrast

- Gratings
  - Red-Green (602, 526nm)
  - Blue-Yellow (470, 577nm)
- Summation of band responses



Comparison

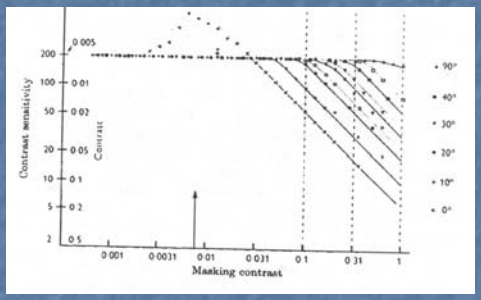
- Low pass filter rather than bandpass filter
- Sensitivity is lower
  - More sensitive to luminance change than to chrominance change
- High frequency cut-off is 11 cycles per degree rather than 30 cycles per degree
  - Color acuity is lower than luminance acuity

Visual Masking

- Certain frequencies and orientation mask others perceptually
- Experiments
  - Test grating presented on a masking grating
  - At different contrast of the masking grating
  - Measure the CSF for the test grating

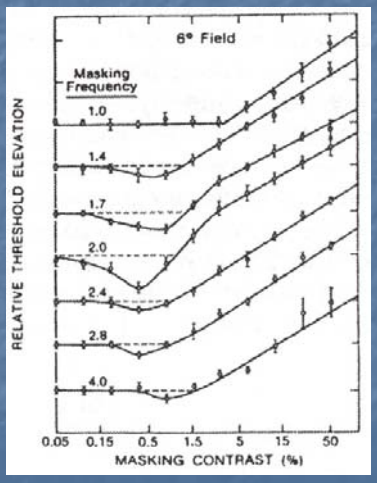
Orientation

- Test: Vertical 2 cycles/deg
- Contrast sensitivity with different mask contrast
- For different orientation masking grating
- As difference in angle increases, masking effect reduces
- Masking more effective at higher contrasts
- Facilitation at low contrast for similar orientation

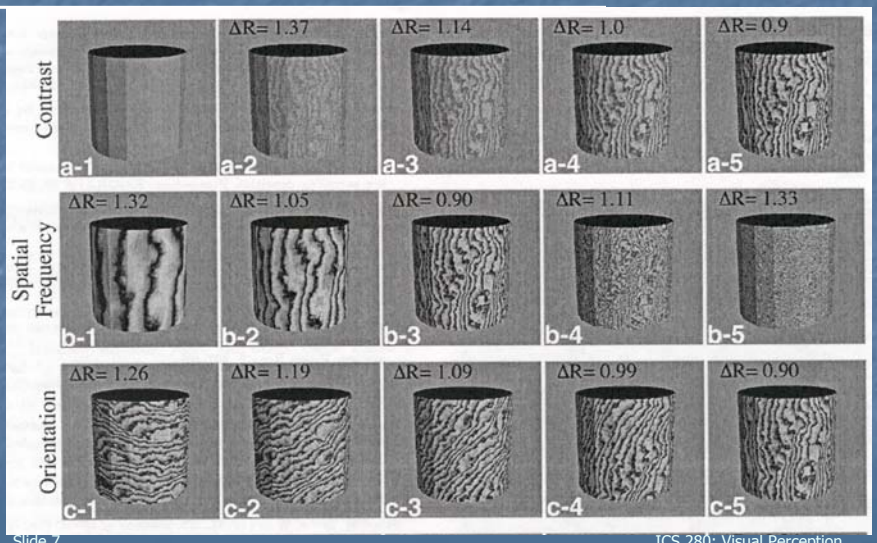


Spatial Frequency

- Similar plot but with threshold
- Test frequency: 2 cycles/deg
- Masking frequency: 1-4 cycles/deg
- Low contrast creates facilitation
  - Threshold decreases (more sensitive)
- High contrast creates masking
  - Threshold increases (less sensitive)



Effects


Contrast
ΔR= 1.37
ΔR= 1.14
ΔR= 1.0
ΔR= 0.9
a-1
a-2
a-3
a-4
a-5
Spatial Frequency
ΔR= 1.32
ΔR= 1.05
ΔR= 0.90
ΔR= 1.11
ΔR= 1.33
b-1
b-2
b-3
b-4
b-5
Orientation
ΔR= 1.26
ΔR= 1.19
ΔR= 1.09
ΔR= 0.99
ΔR= 0.90
c-1
c-2
c-3
c-4
c-5