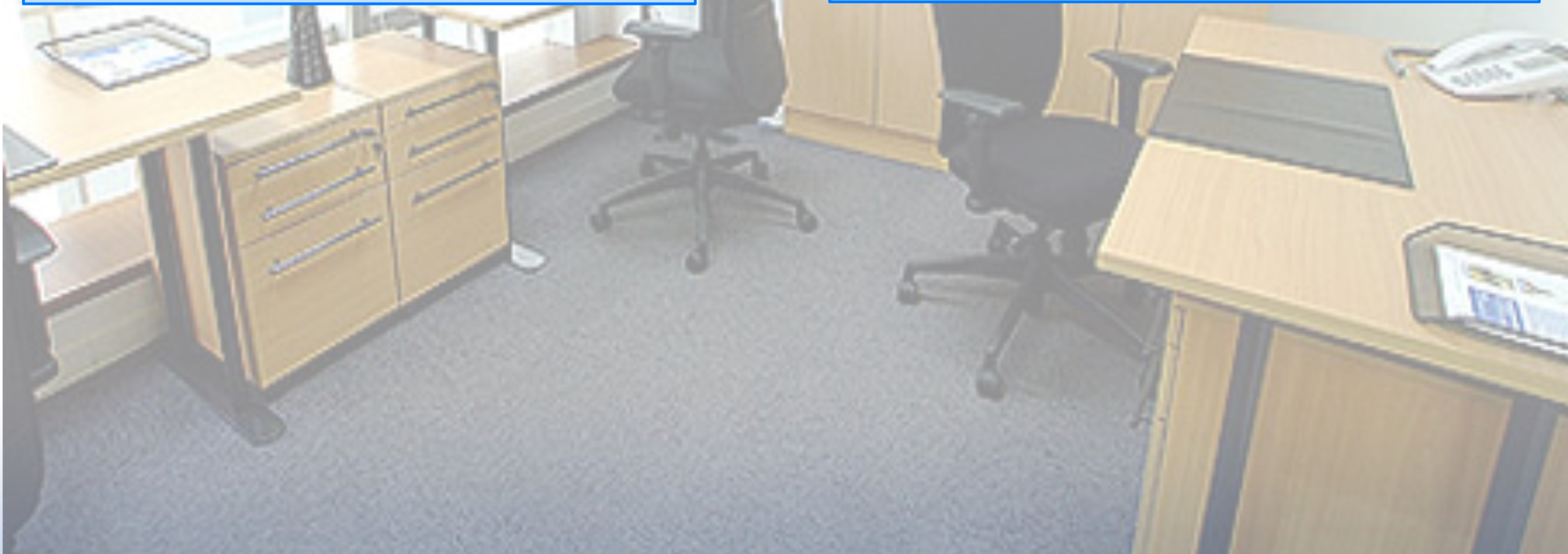
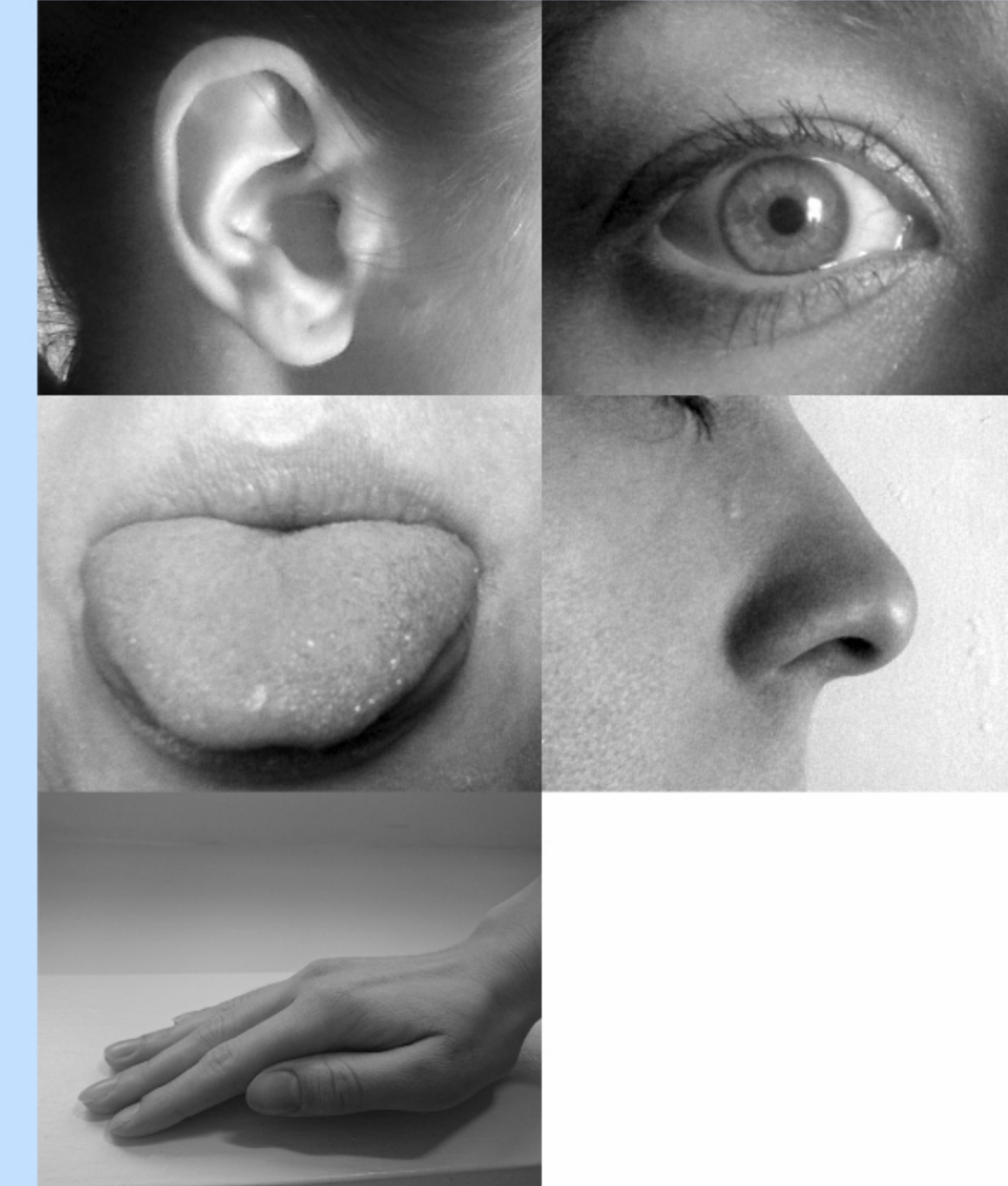


Announcements

- Work in groups - groups of 2 for MPs, groups of 2-4 for the final project.
- Final project ideas?

VR System: Hardware, Software and Perceptual Psychology



What is Reality?



The Matrix: Prison for your Mind - The Rabbit Hole

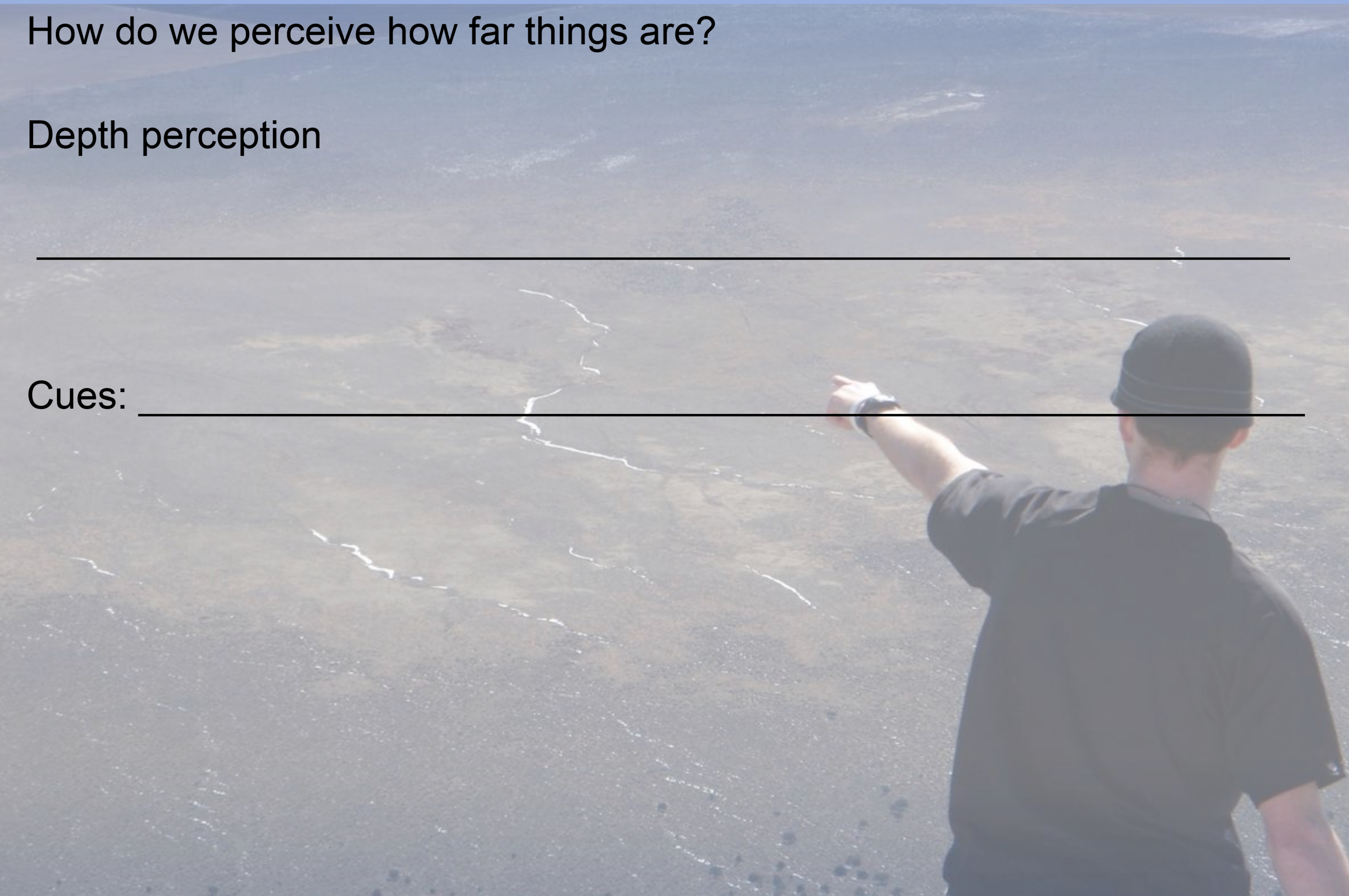
<https://www.youtube.com/watch?v=O4zICmyuNvs>

What is Reality? Sensation and Perception

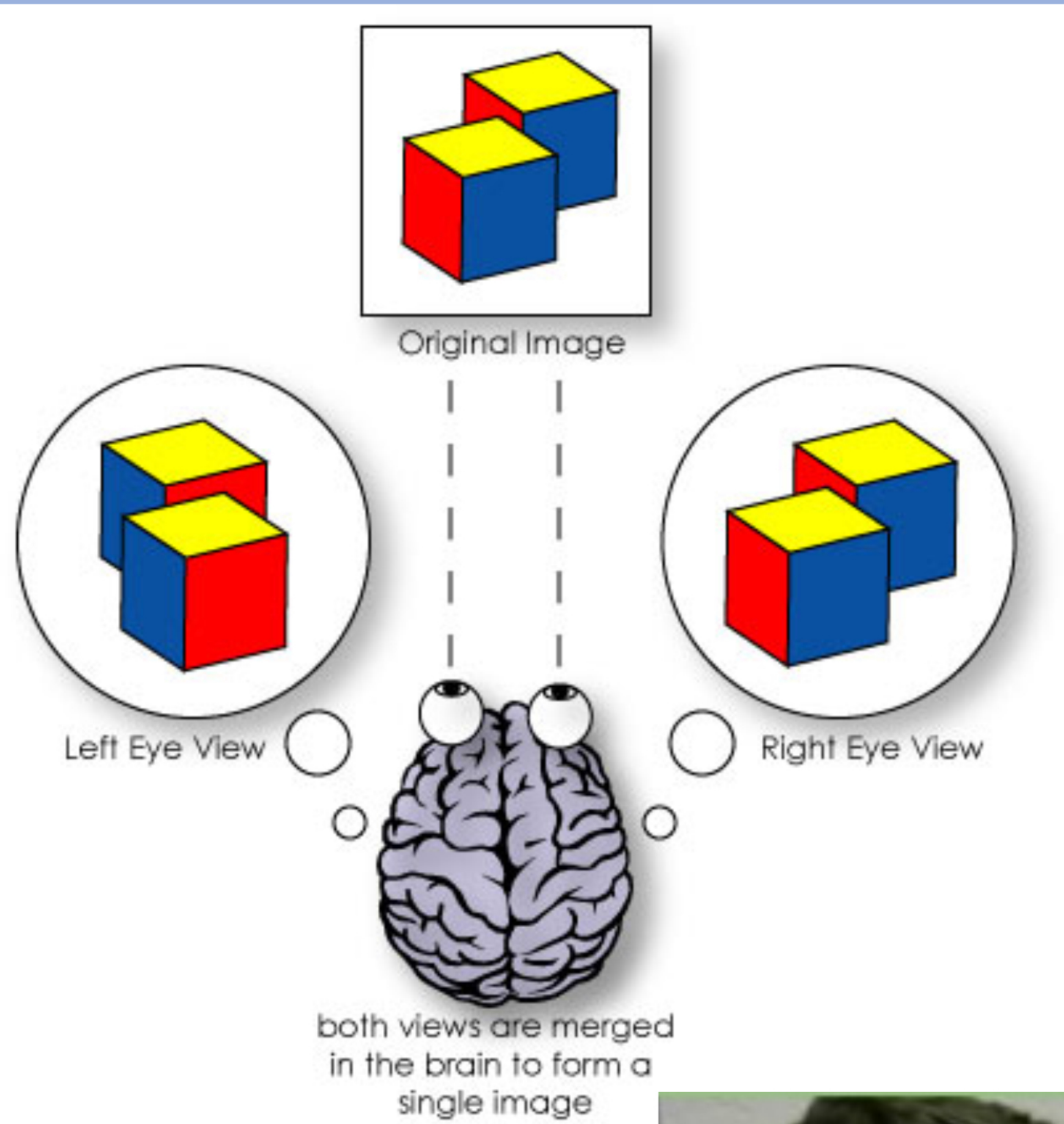
How do we perceive how far things are?

Depth perception

Cues: _____



Depth Perception



What is Reality? Sensation and Perception

How do we perceive X?

X is

- depth
- color
- sound
- taste
- comfort
- presence
- yourself
- reality

What is Reality? Sensation and Perception

Instructions

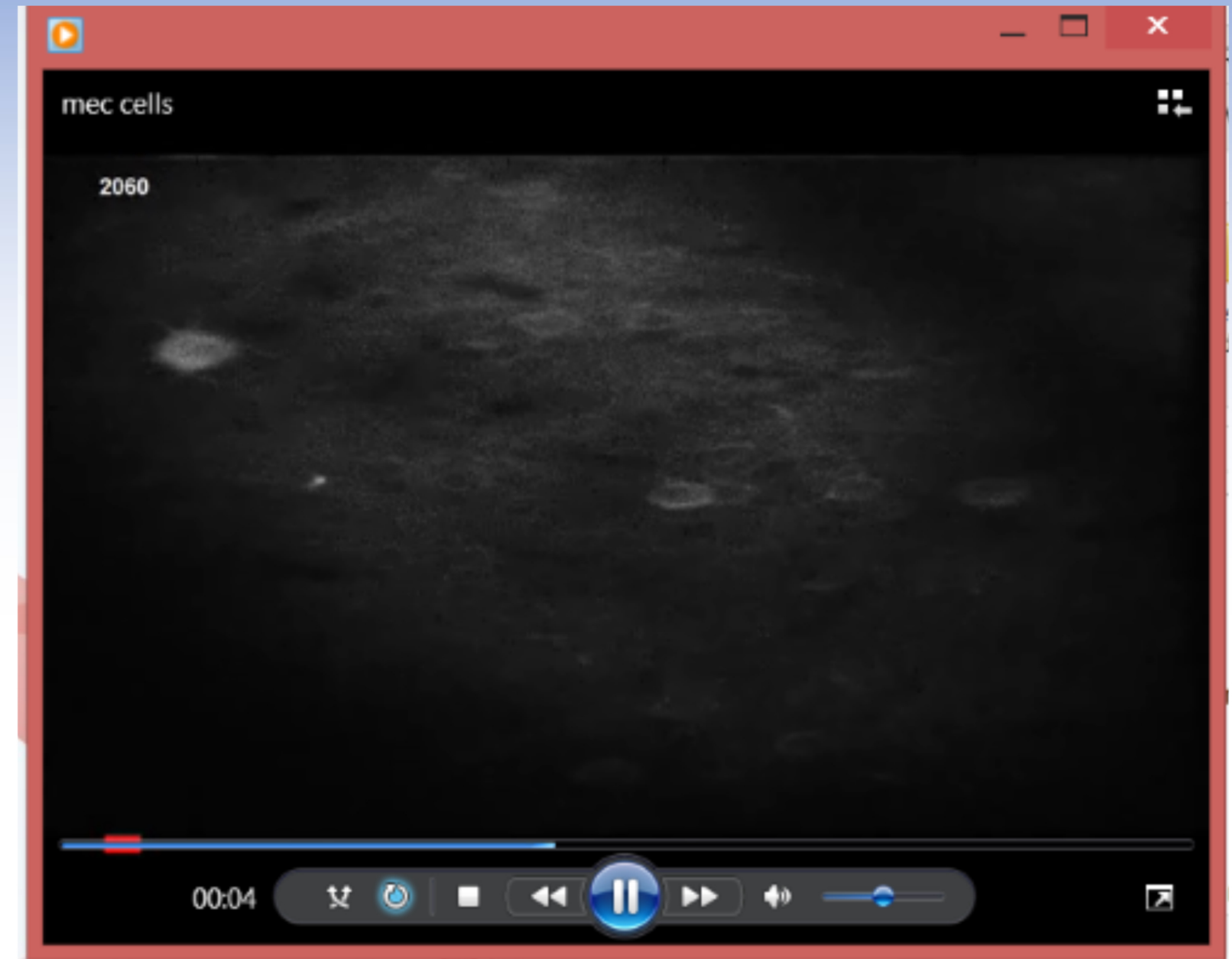
**Count how many times the
players wearing white pass
the basketball.**

▶ ⏮ 🔊 0:08 / 1:21



<https://www.youtube.com/watch?v=vJG698U2Mvo>

Perception Process



Human	19,000,000,000 –23,000,000,000	For average adult "The average number of neocortical neurons was 19 billion in female brains and 23 billion in male brains."
-------	-----------------------------------	---



https://en.wikipedia.org/wiki/List_of_animals_by_number_of_neurons

Perception Process

Sensory System	Modality	Stimulus Energy	Receptor Class	Receptor Cell Types
Somatosensory	Touch	Tap, flutter 5–40 Hz	Cutaneous mechanoreceptor	Meissner corpuscles
Somatosensory	Touch	Motion	Cutaneous mechanoreceptor	Hair follicle receptors
Somatosensory	Touch	Deep pressure, vibration 60–300 Hz	Cutaneous mechanoreceptor	Pacinian corpuscles
Somatosensory	Touch	Touch, pressure	Cutaneous mechanoreceptor	Merkel cells
Somatosensory	Touch	Sustained pressure	Cutaneous mechanoreceptor	Ruffini corpuscles
Somatosensory	Proprioception	Stretch	Mechanoreceptor	Muscle spindles
Somatosensory	Proprioception	Tension	Mechanoreceptor	Golgi tendon organ
Somatosensory	Temperature	Thermal	Thermoreceptor	Cold and warm receptors
Somatosensory	Pain	Chemical, thermal, and mechanical	Chemoreceptor, thermoreceptor, and mechanoreceptor	Polymodal receptors or chemical, thermal, and mechanical nociceptors
Somatosensory	Itch	Chemical	Chemoreceptor	Chemical nociceptor
Visual	Vision	Light	Photoreceptor	Rods, cones
Auditory	Hearing	Sound	Mechanoreceptor	Hair cells (cochlea)
Vestibular	Balance	Angular acceleration	Mechanoreceptor	Hair cells (semicircular canals)
Vestibular	Balance	Linear acceleration, gravity	Mechanoreceptor	Hair cells (otolith organs)
Olfactory	Smell	Chemical	Chemoreceptor	Olfactory sensory neuron
Gustatory	Taste	Chemical	Chemoreceptor	Taste buds

Stimuli Fusion

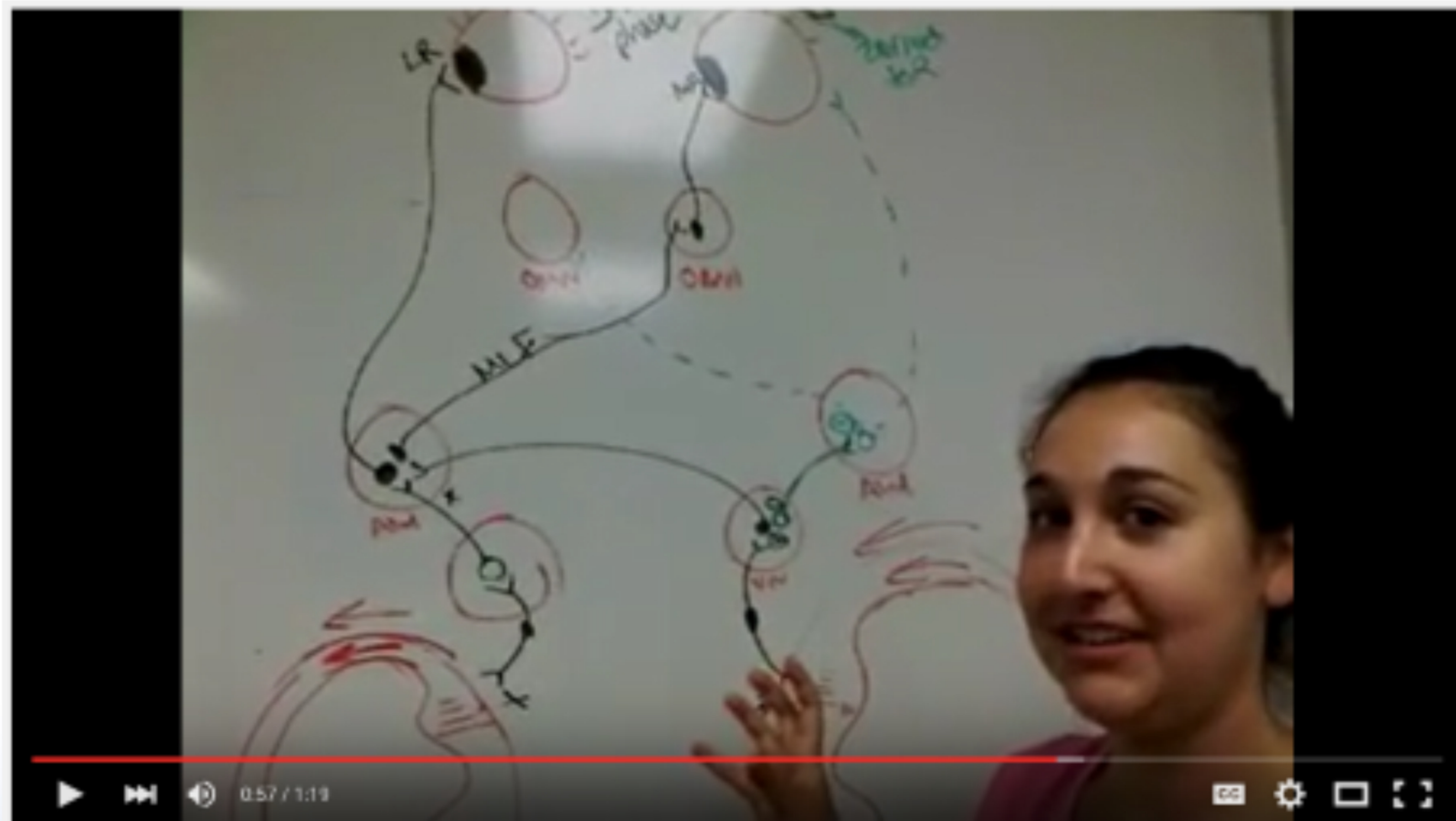
Vection



Platform At Train Station Background Cartoon

<https://www.youtube.com/watch?v=RbOQFlo3g44>

Vestibulo-ocular reflex (VOR)



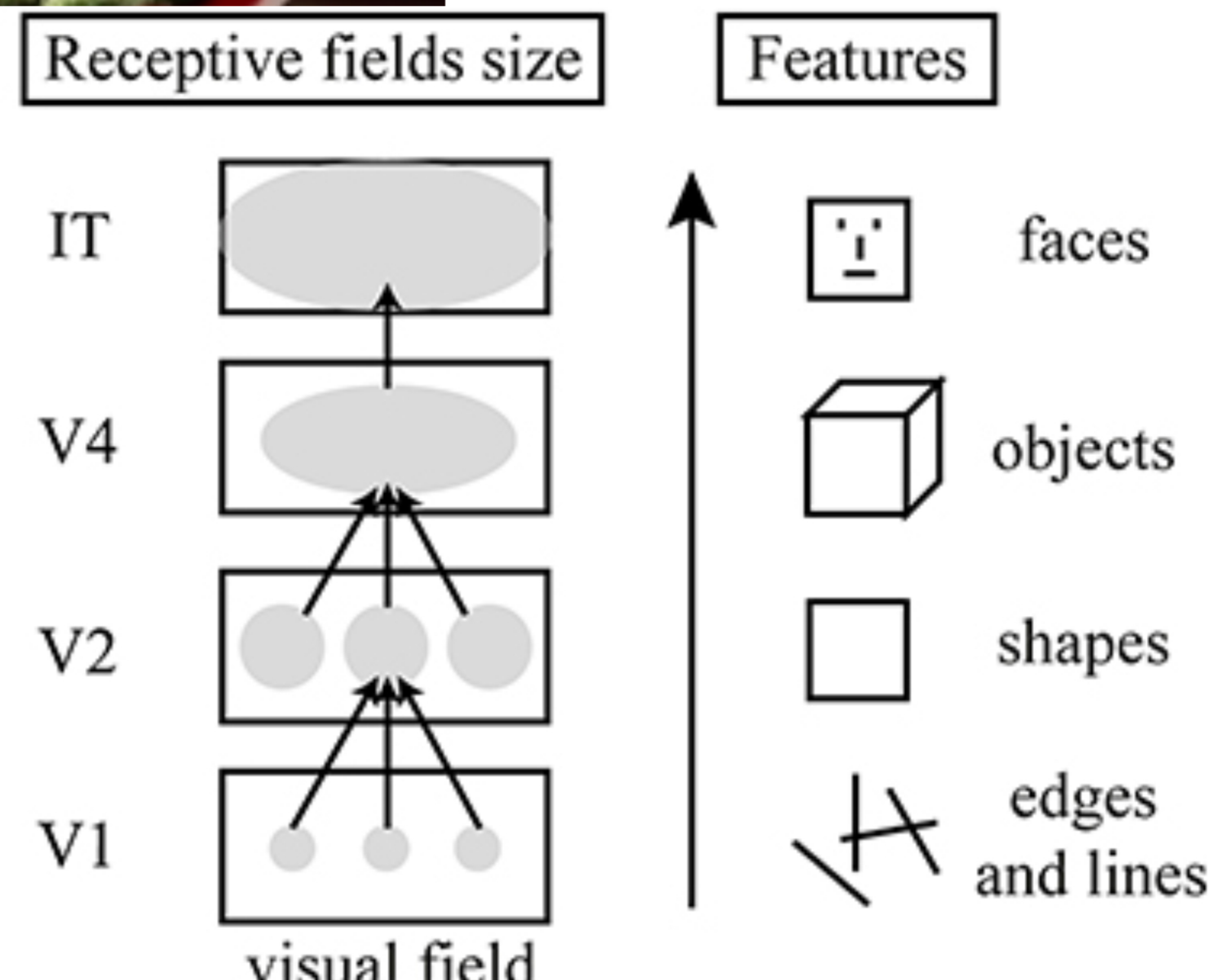
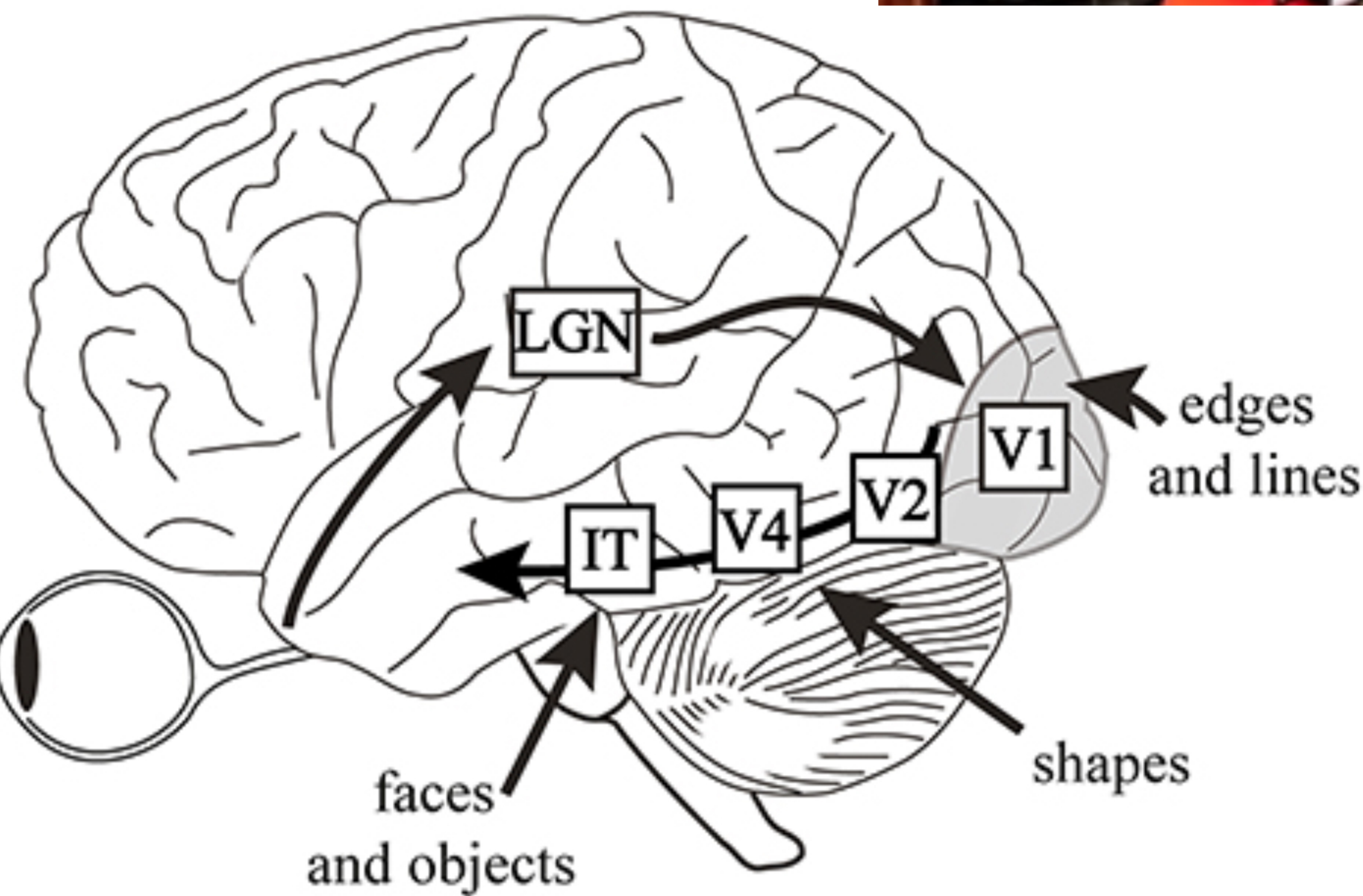
Vestibulo-ocular reflex (VOR) induced nystagmus

<https://www.youtube.com/watch?v=mlbyNq8KedQ>

Stimuli Hierarchical Processing

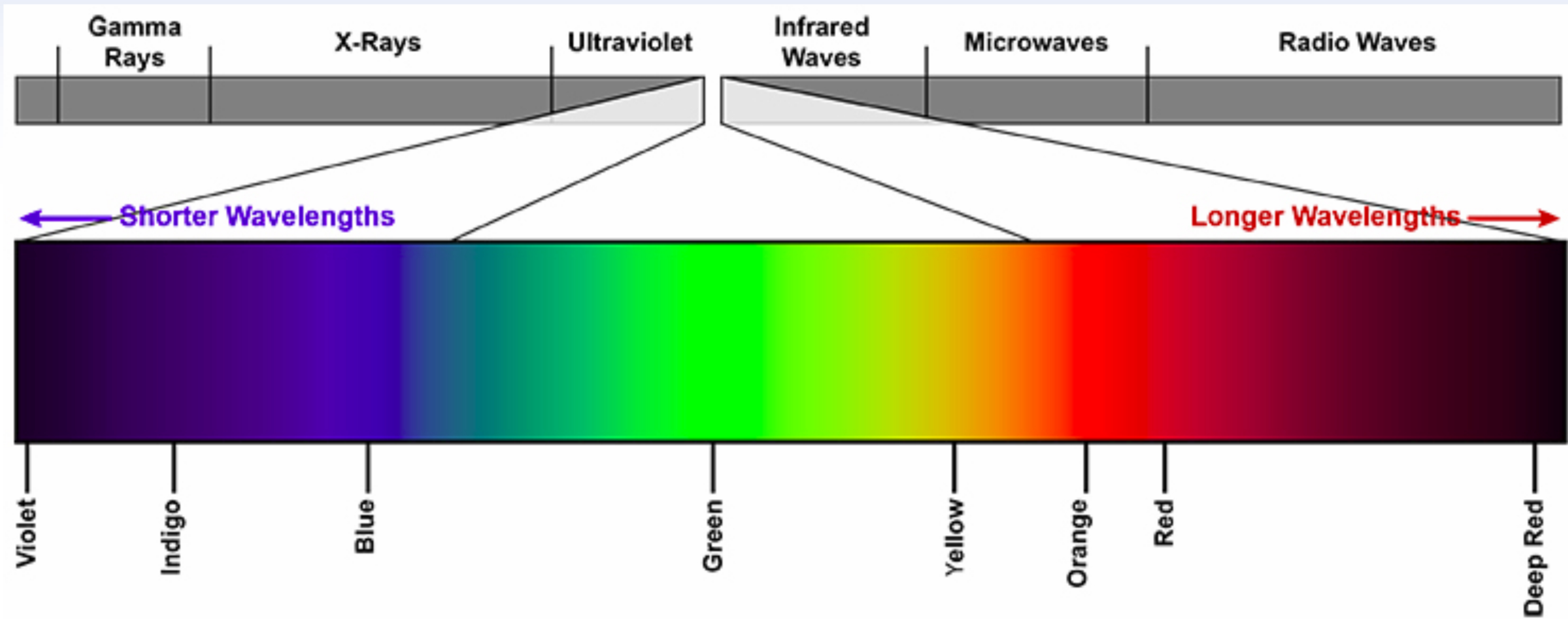


<https://www.youtube.com/watch?v=5cJRe9iDDjs>



Do You Trust Your Vision?

"visible" light



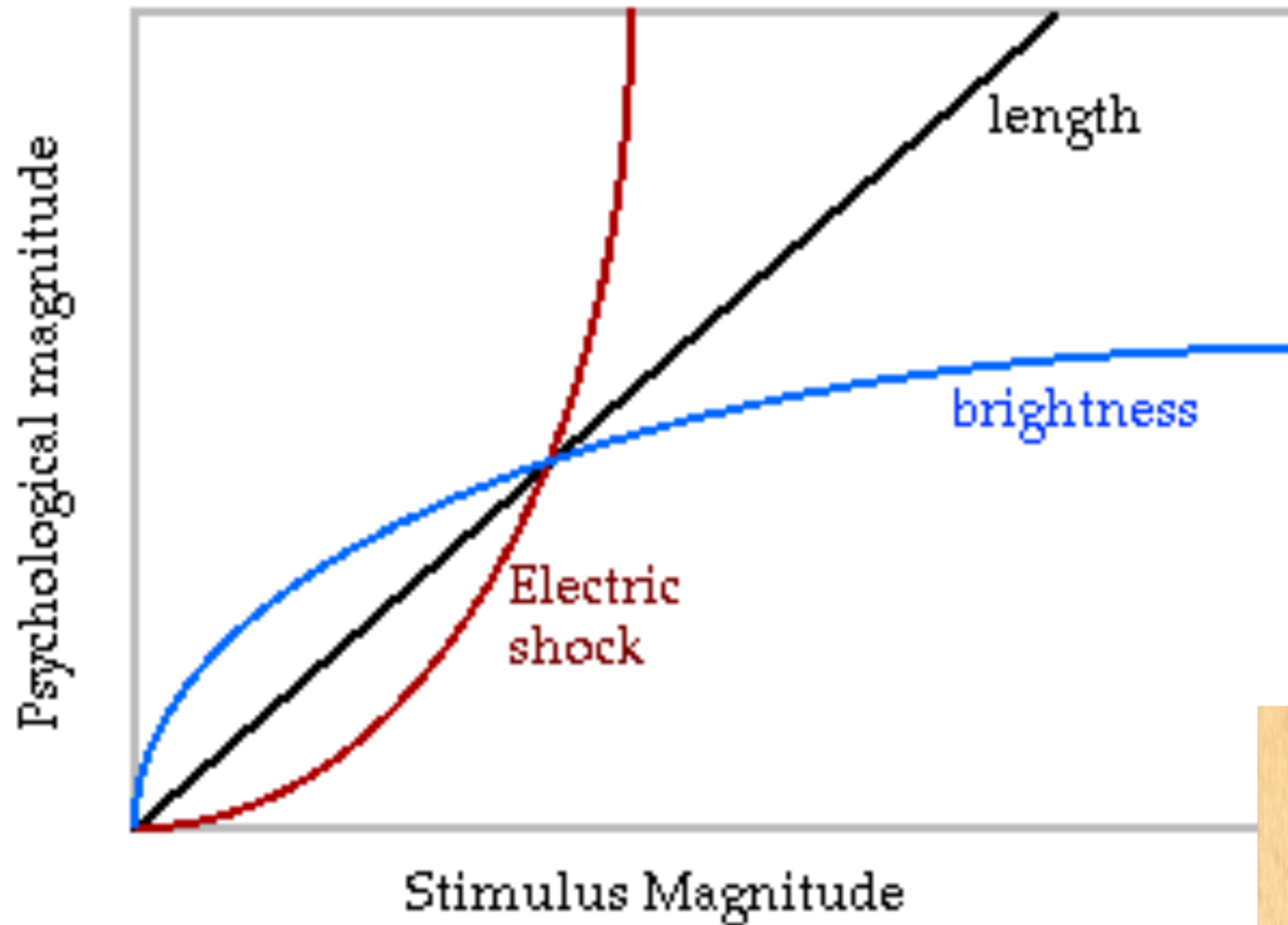
Do You Trust Your Vision?



blind spot in each eye

Psychophysics

Stevens' Power Law



Difference Threshold

The smallest amount of change in a physical stimulus that a person can detect 50% of the time. This is also called the “just noticeable difference.”

If someone turns the music up slowly, at what point do you notice it has become louder?

If you hold a handful of sand, and someone adds one grain at a time to the pile, when do you notice it has become heavier?

If your best friend trims a half inch off of their hair, will you notice the difference?

Adaptation



More Optical Illusions

