The Illusion of Reality

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THE ILLUSION

- “Virtual reality works because reality is virtual”
  - Lawrence Stark, UC Berkeley

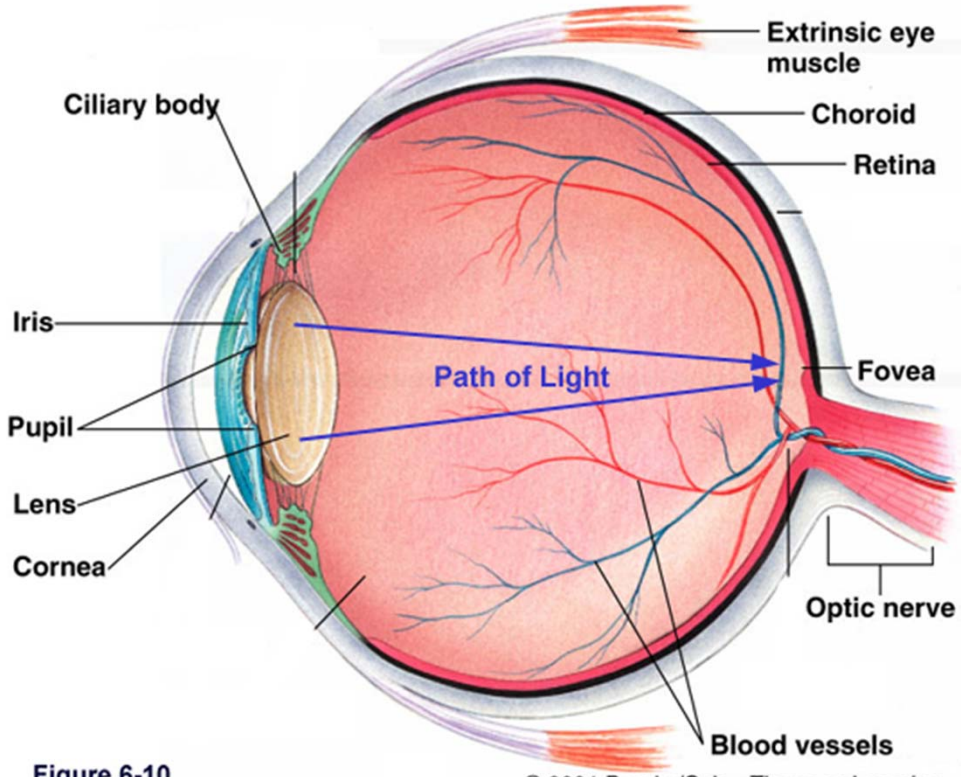
T H E I L L U S I O N

- We experience a high-resolution spatial and temporal continuum when we look around the 3D environment we are in.

- This is an illusion!

THE ILLUSION

- The retinal image of the visual field is in focus only in a very small area: The fovea.



T H E I L L U S I O N

- We need to sample the visual field, with saccades and fixations (~3 per sec.) to construct an image.

what we see and scanpaths to „see“ more

T H E I L L U S I O N

- Sampled information is relatively sparse when you walk into a room. You see the typical things and think you have seen the whole room.

T H E I L L U S I O N

- You can change the way that you see by changing perceptual filters.
- For example: “I want to see squares”...

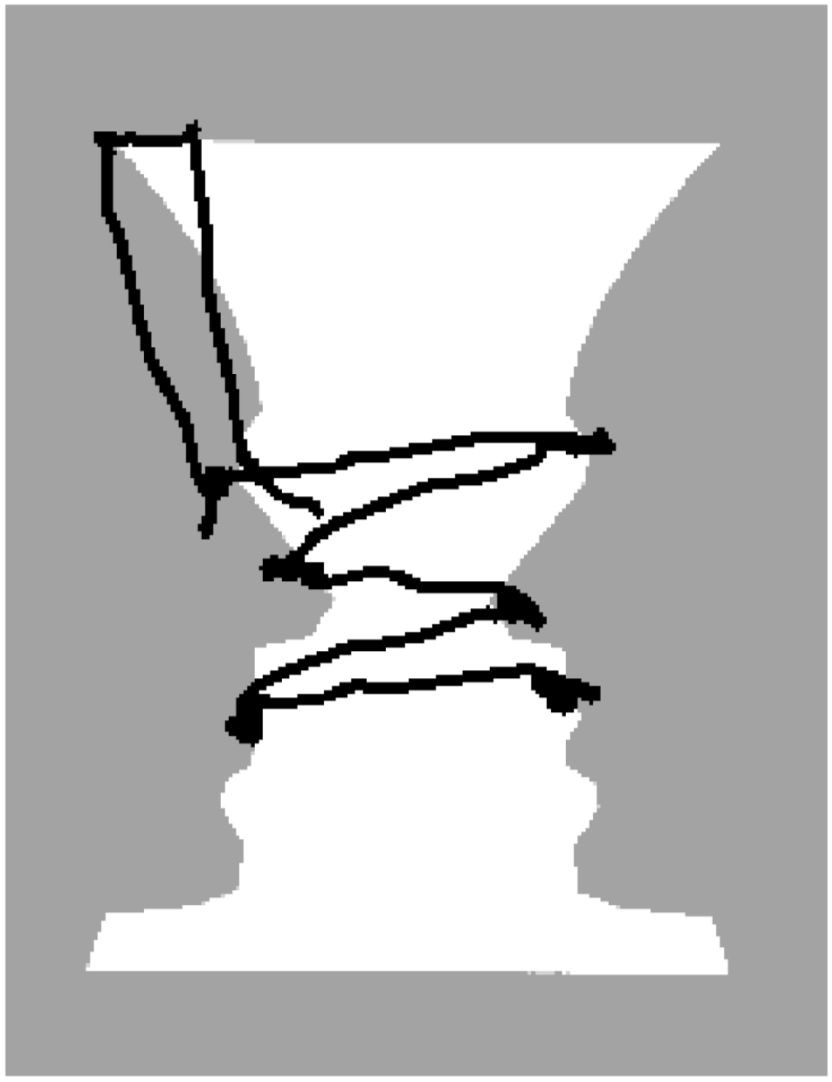
“I want to see **squares**”

"I want to see **circles**"

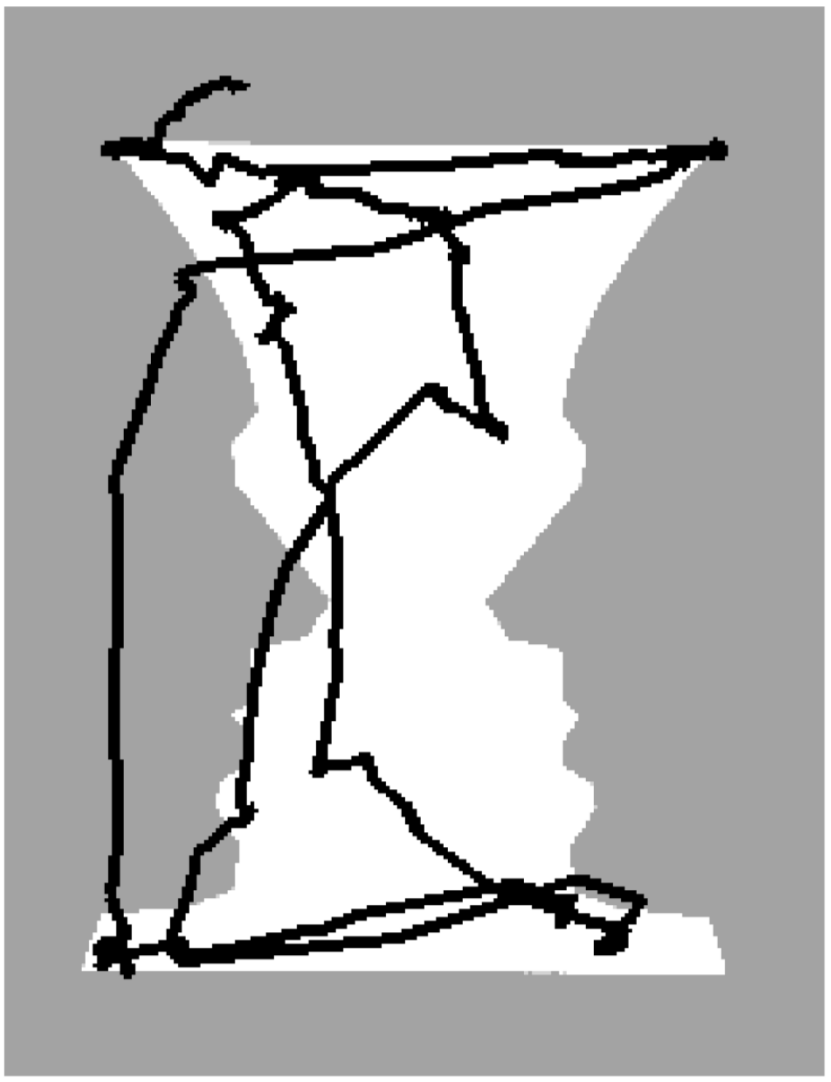
T H E I L L U S I O N

- Fixating ~90 % of the time.
- Checking and rechecking points of interest, as if gathering support for what we think we are seeing.
- It is hard to overcome strong presuppositions, such as what a room looks like...

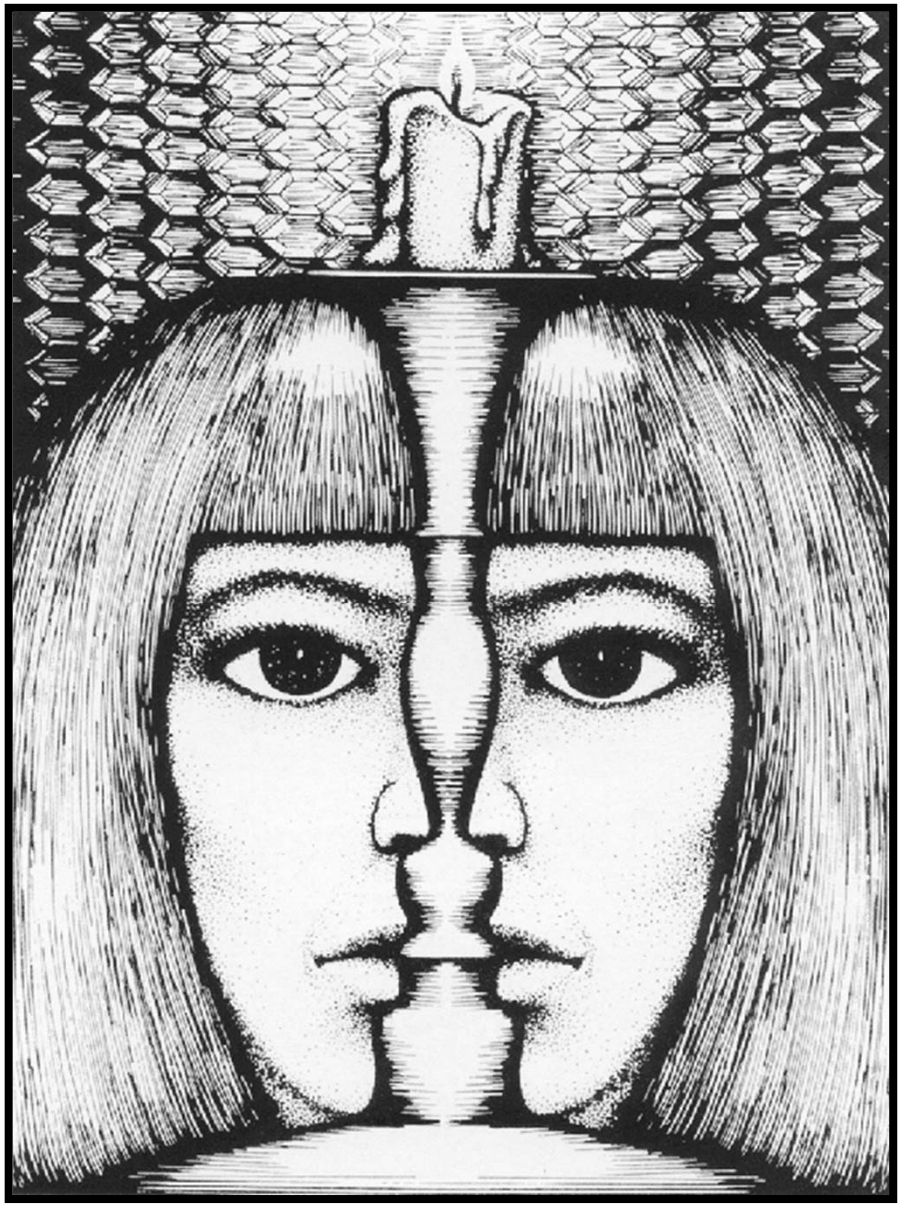
... or what a vase looks like



(a) Scanpath for two faces



(b) Scanpath for vase

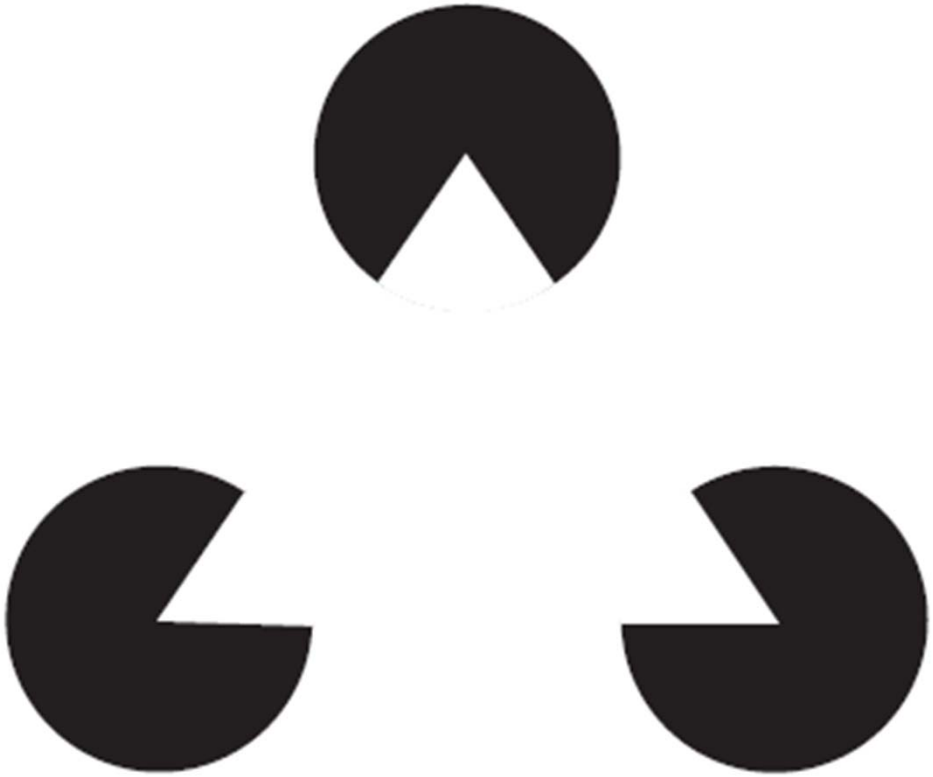


T H E I L L U S I O N

- We see what is in our mind's eye, and use sampled visual information to verify this.
- The scanpath is driven by our mental model. Change the model and the scanpath changes.

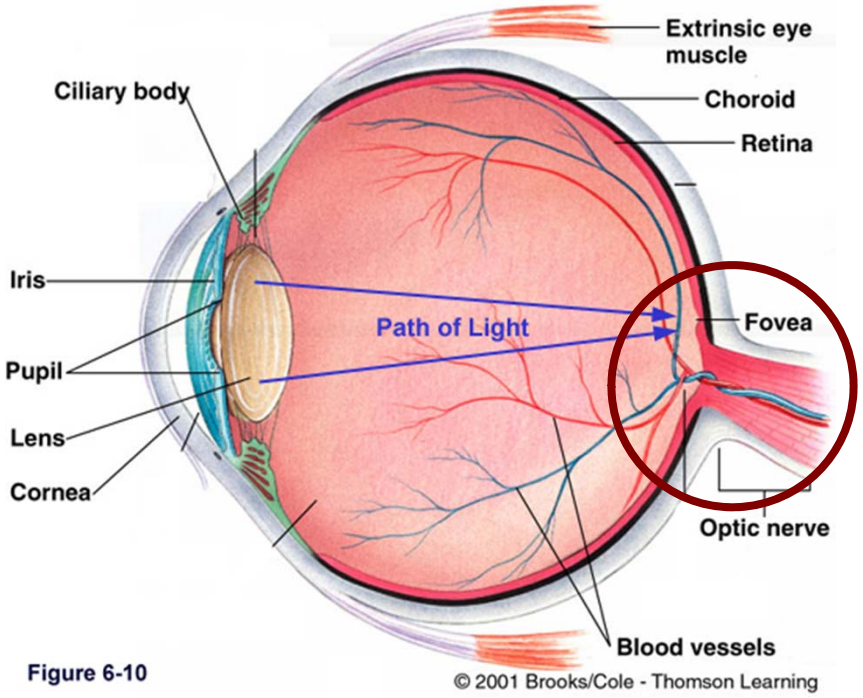
T H E I L L U S I O N

- Our model can even make us see things that we don’t have any sensory data for!



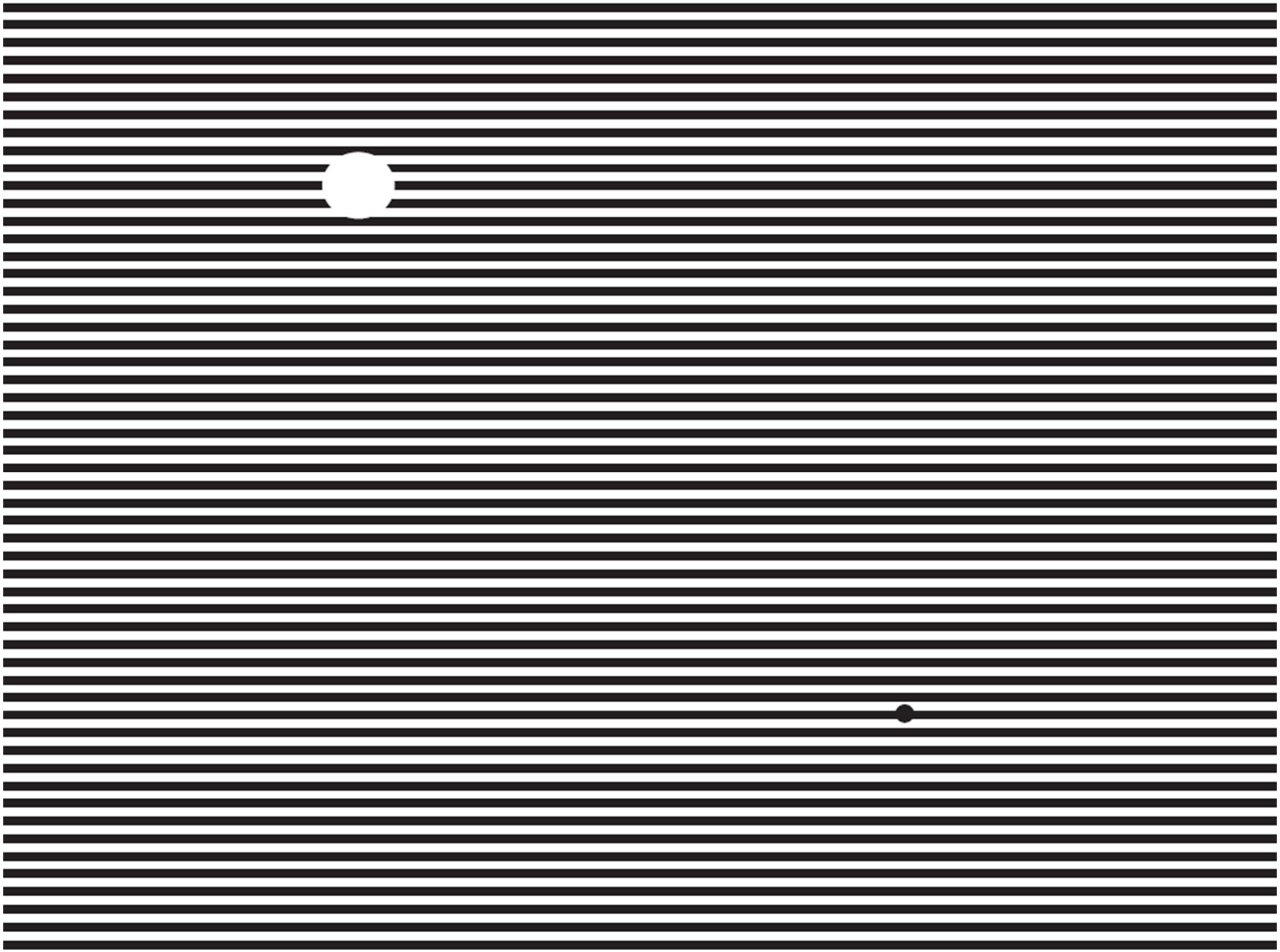
THE ILLUSION

- That's a good thing, because we are actually missing some data...



T H E I L L U S I O N

- Can you find your blind spot?



THE ILLUSION

- Information is integrated across neighboring areas.

- It’s image processing!

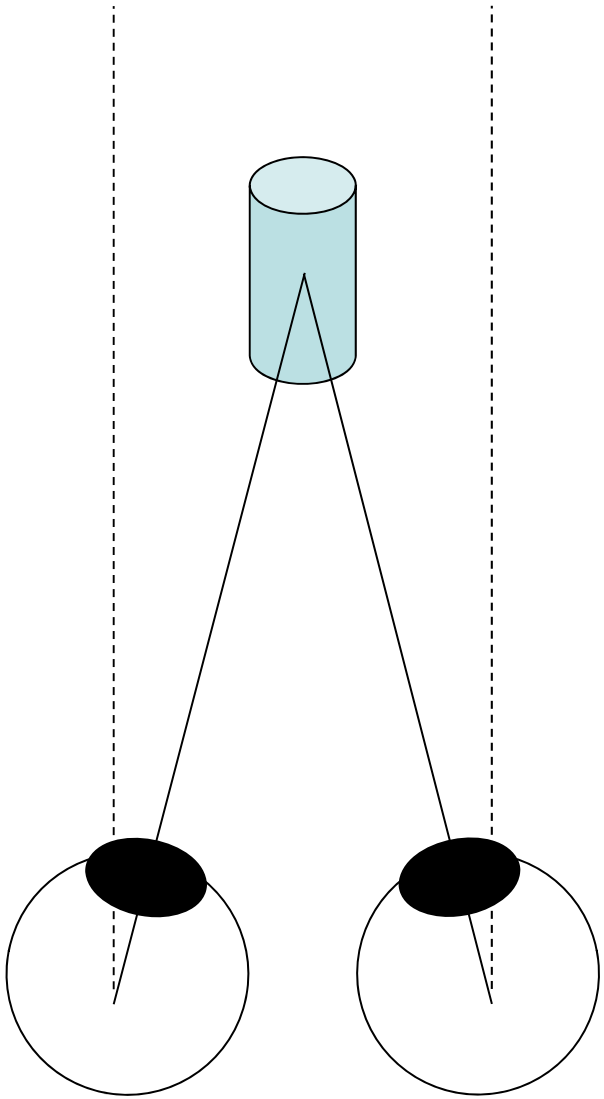
THE ILLUSION OF 3D WORLDS

3D WORLDS

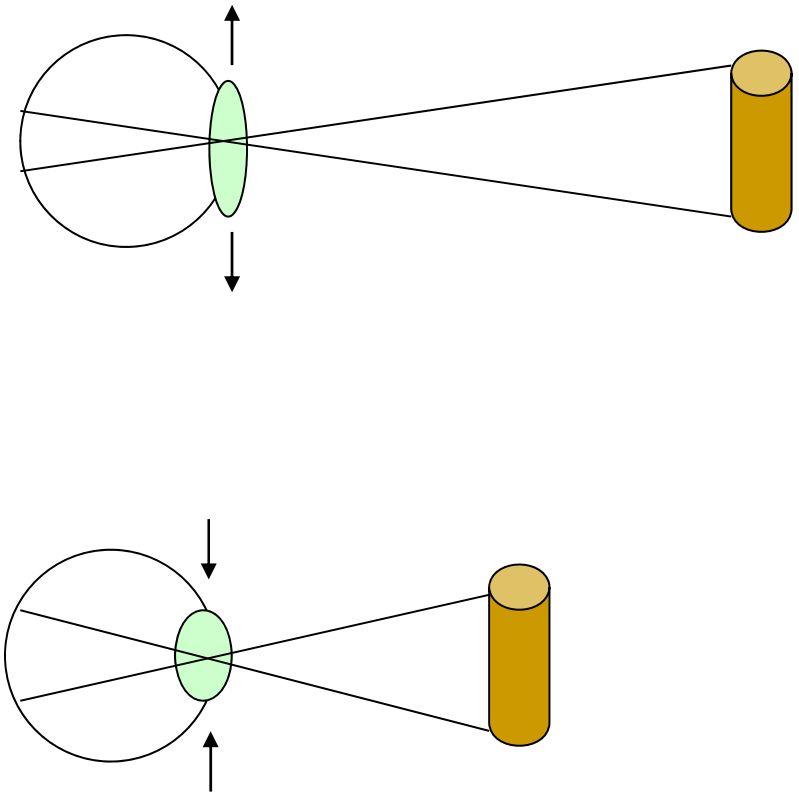
- How do we perceive immersion in a 3D environment?

3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - Motion cues



convergence



accomodation

3D WORLDS

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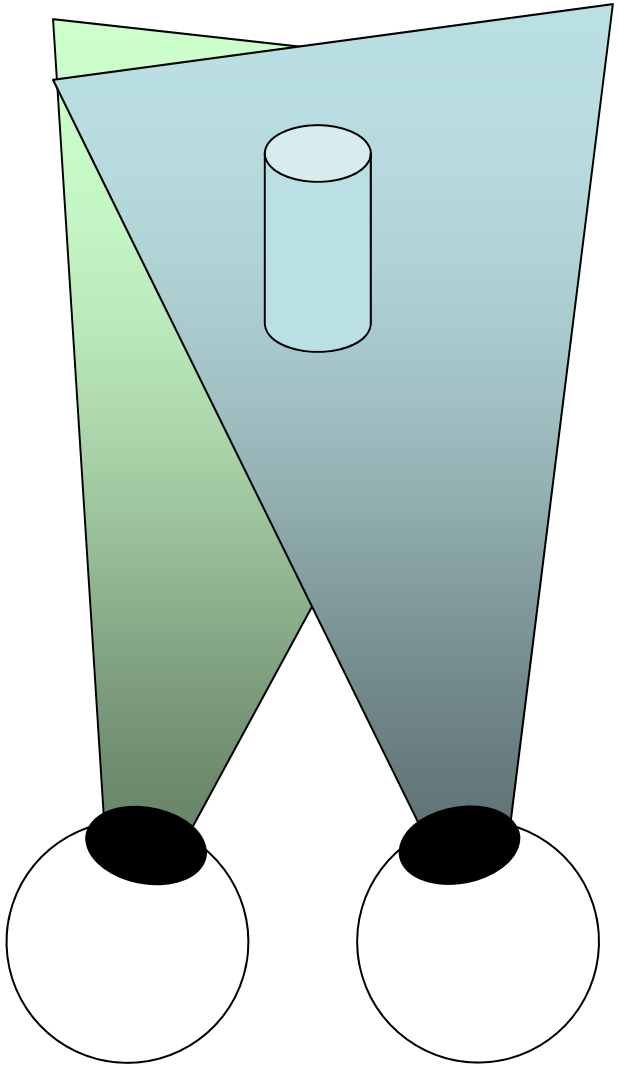

stereopsis

3D WORLDS

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But even if we close one eye we see the world in 3D – how can that be? (also on TV etc.)

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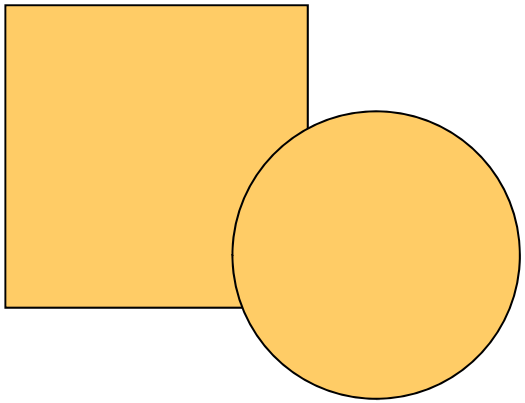
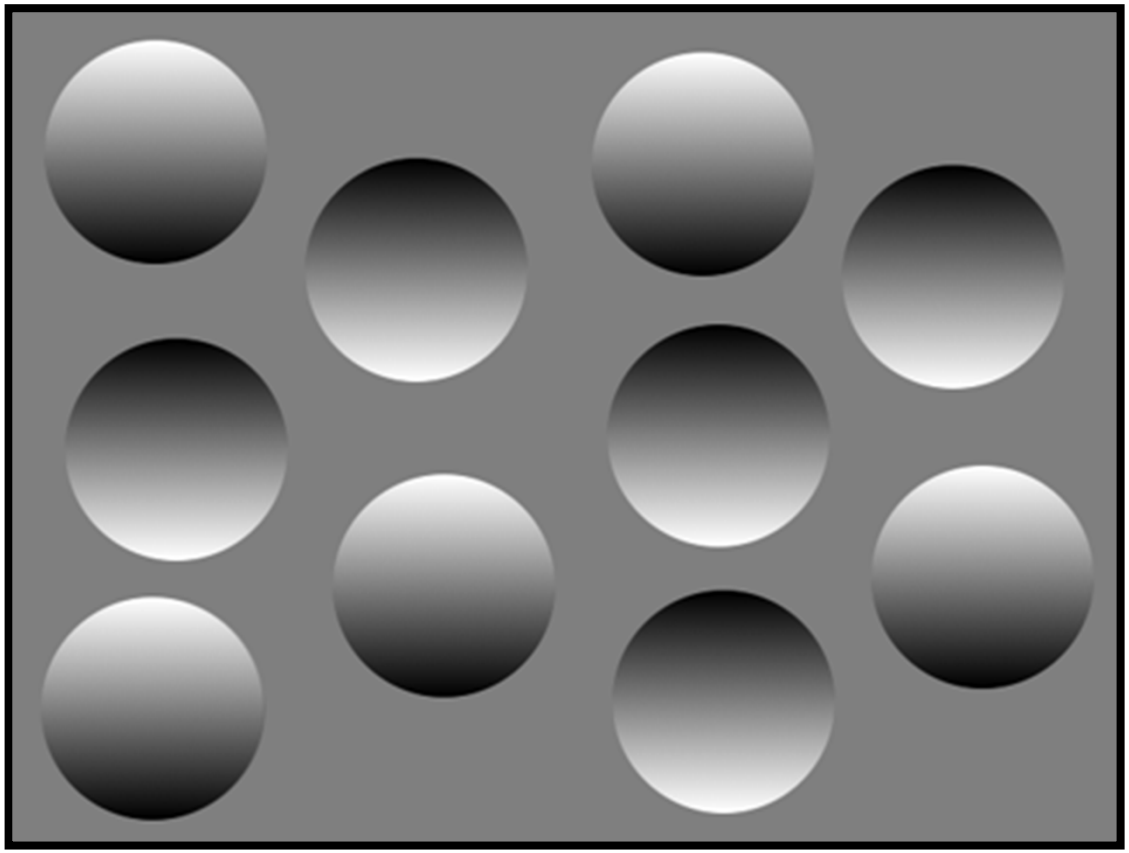
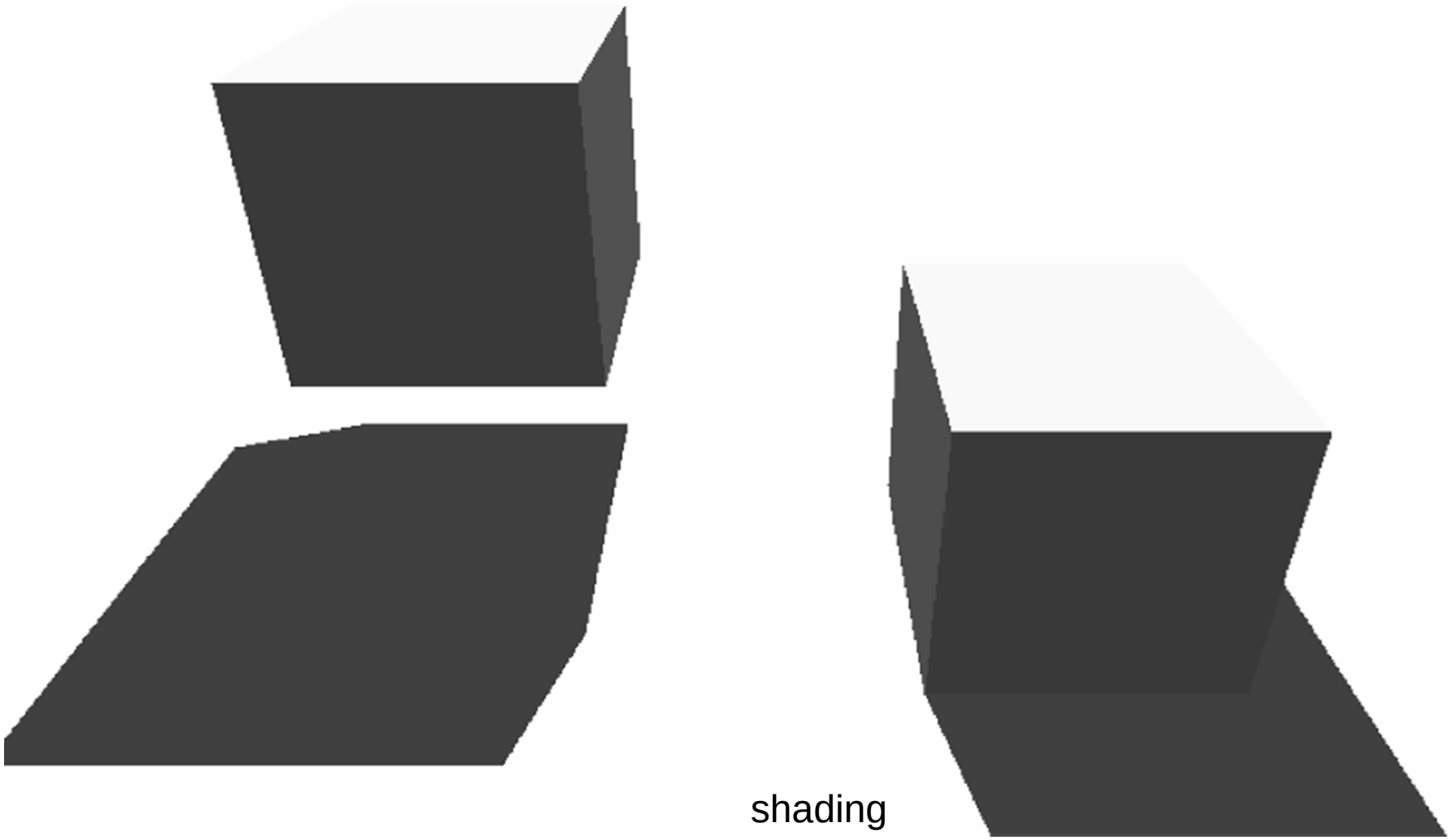


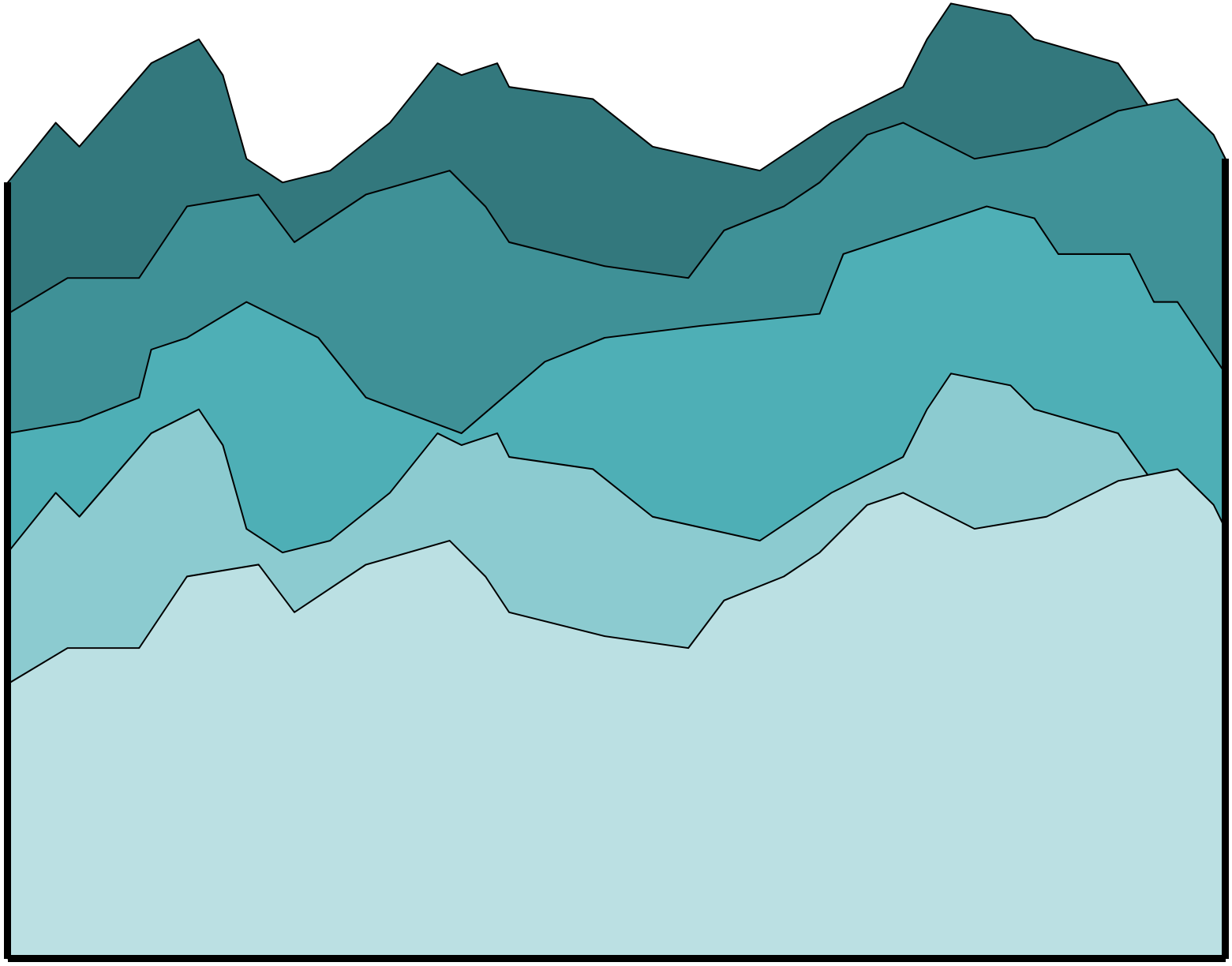
interposition / occlusion



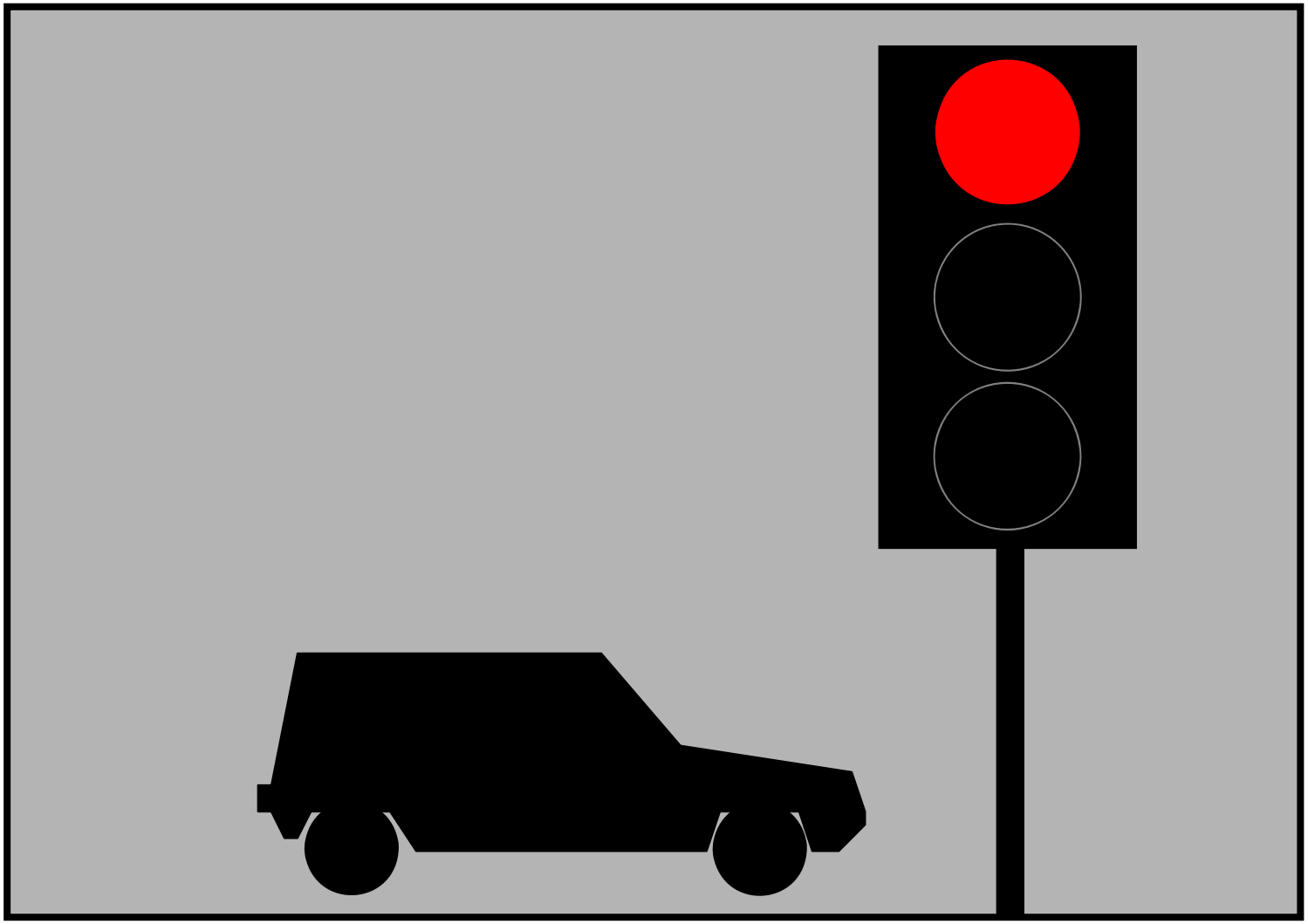
shading

shading

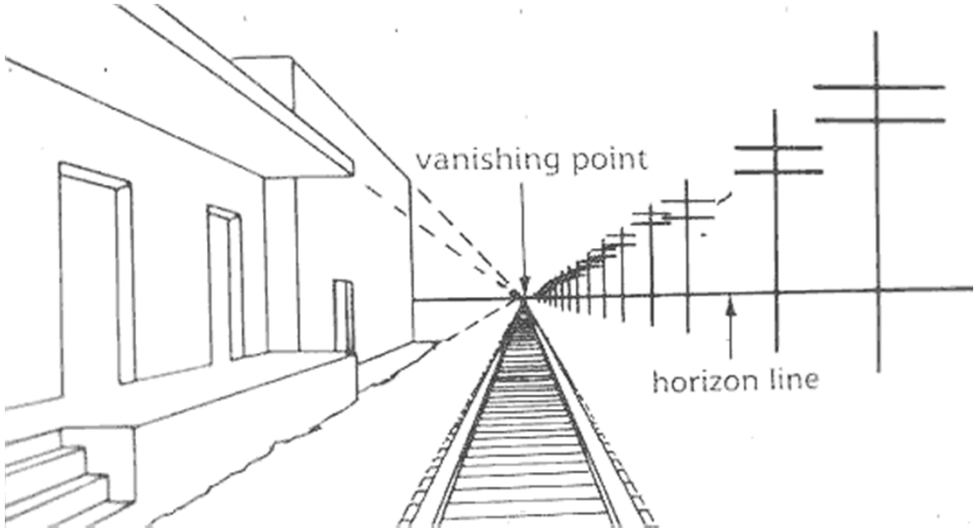

shading

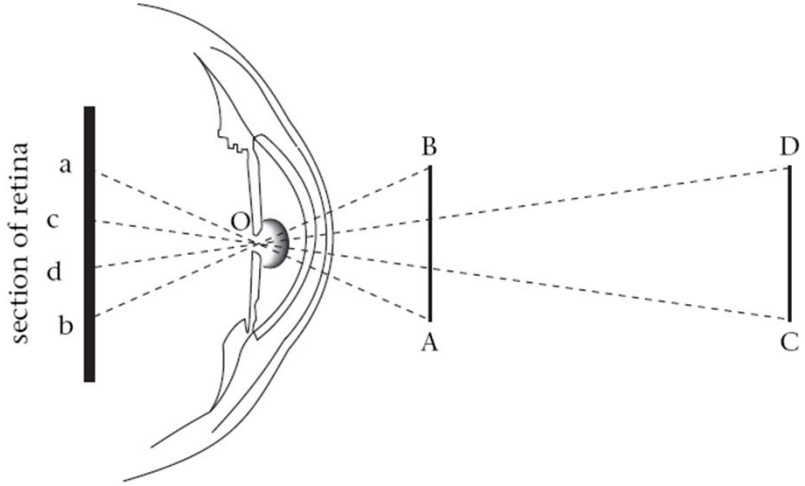


brightness / lighting / color

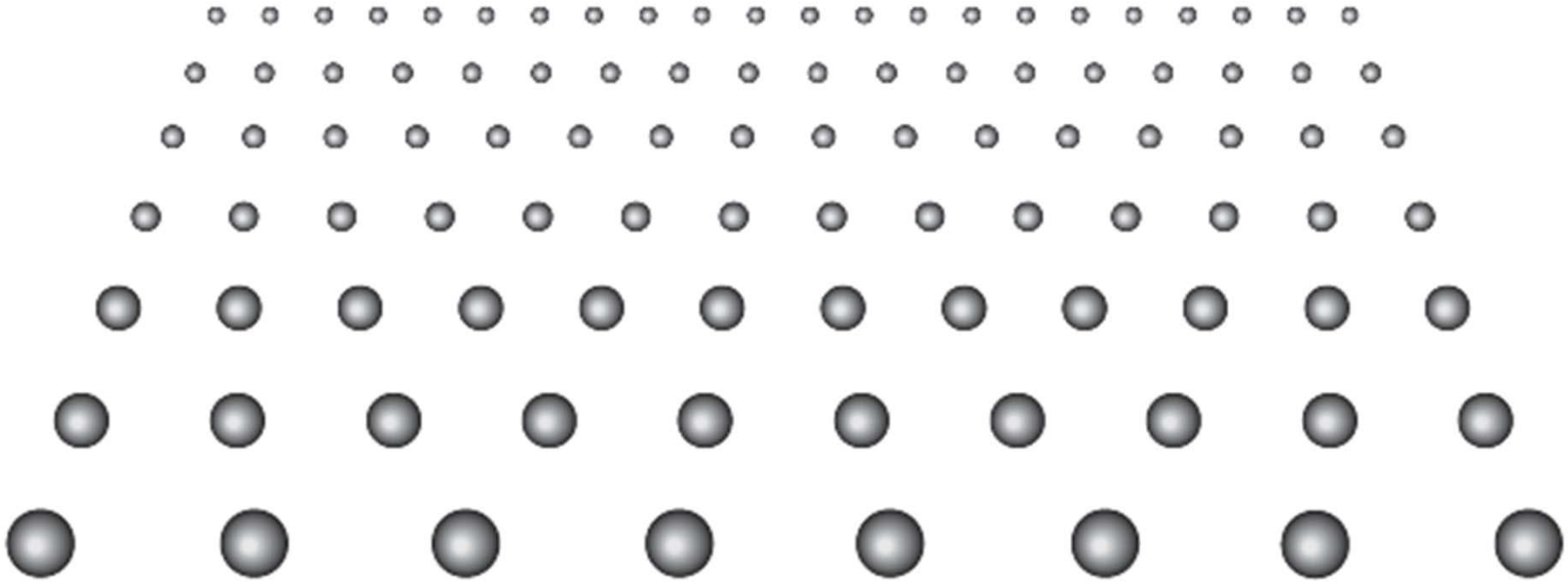


size





linear perspective



texture gradient

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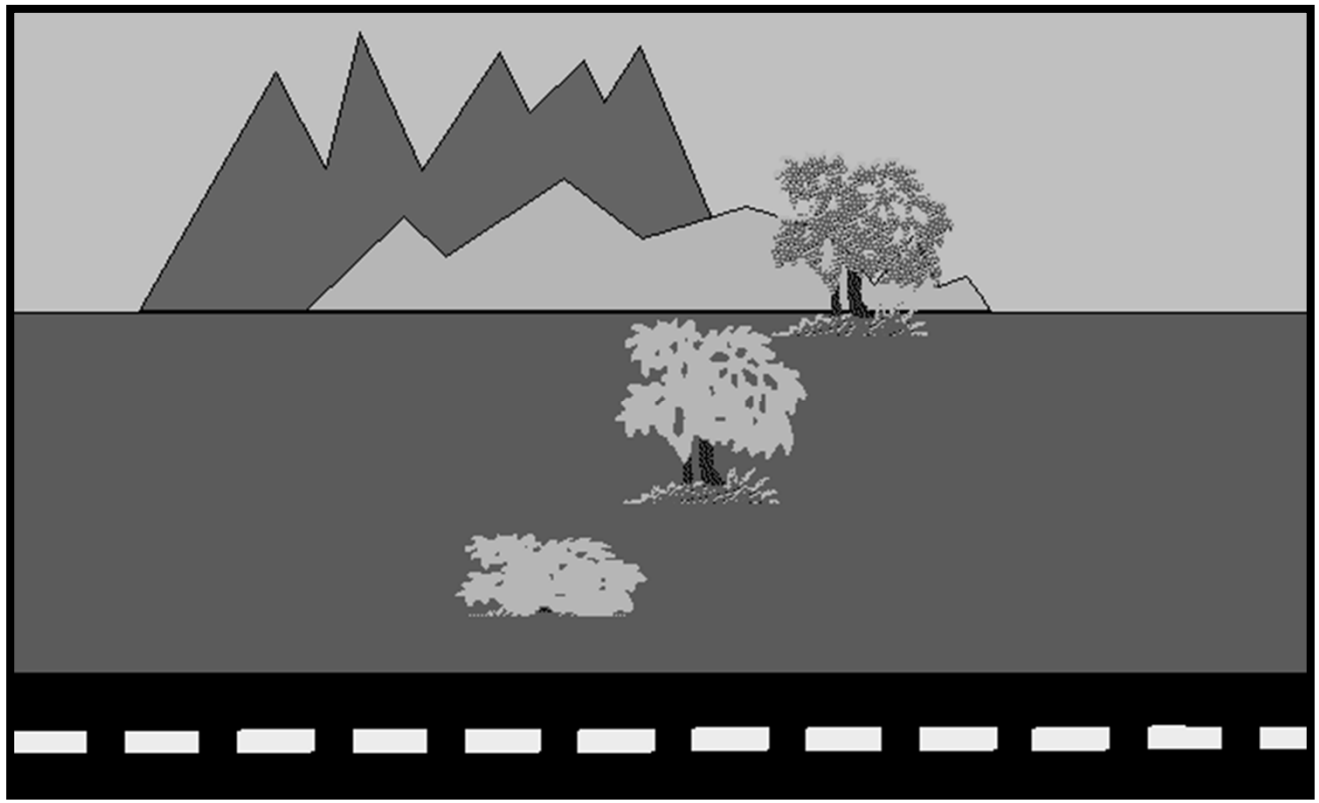

motion parallax / head parallax

3D WORLDS

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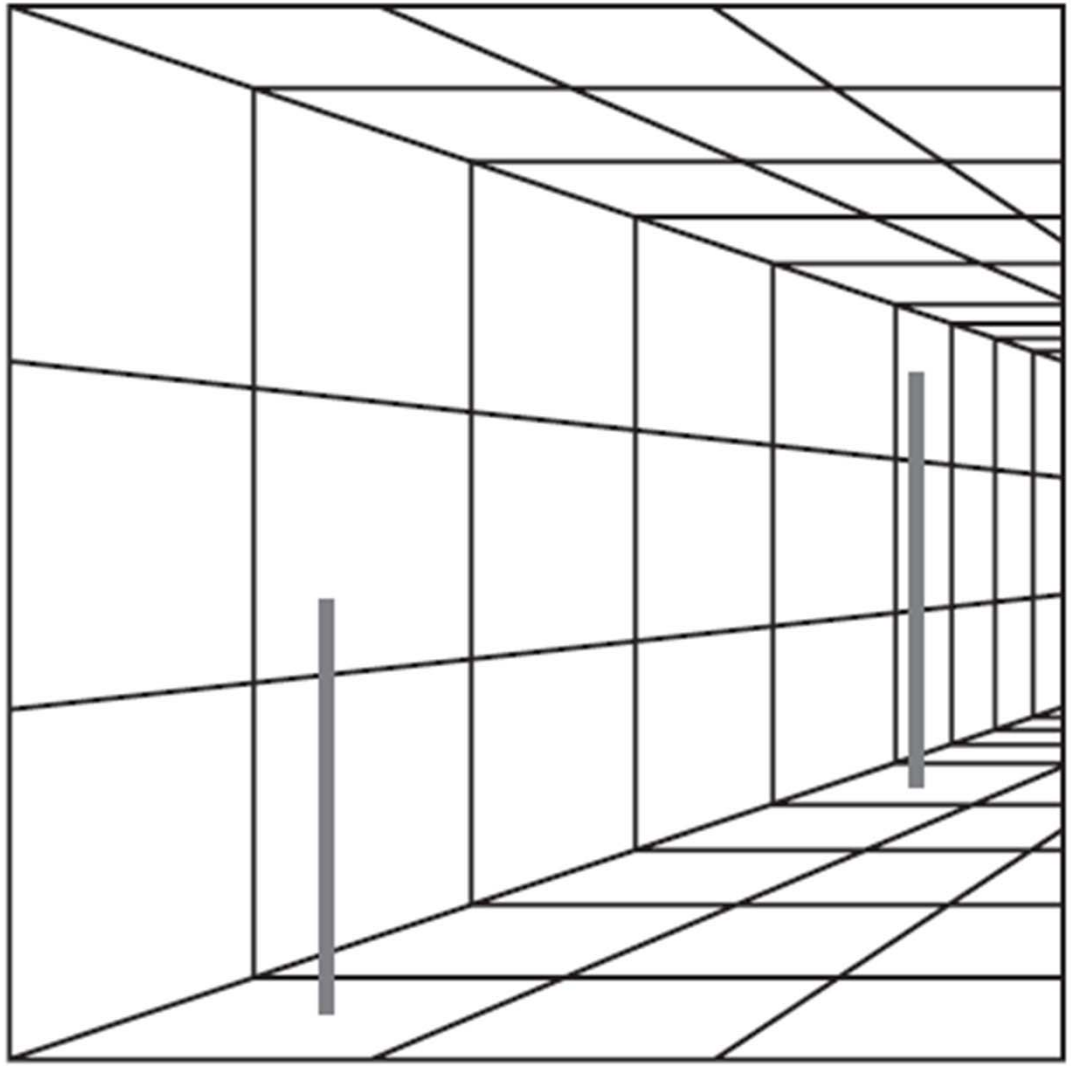
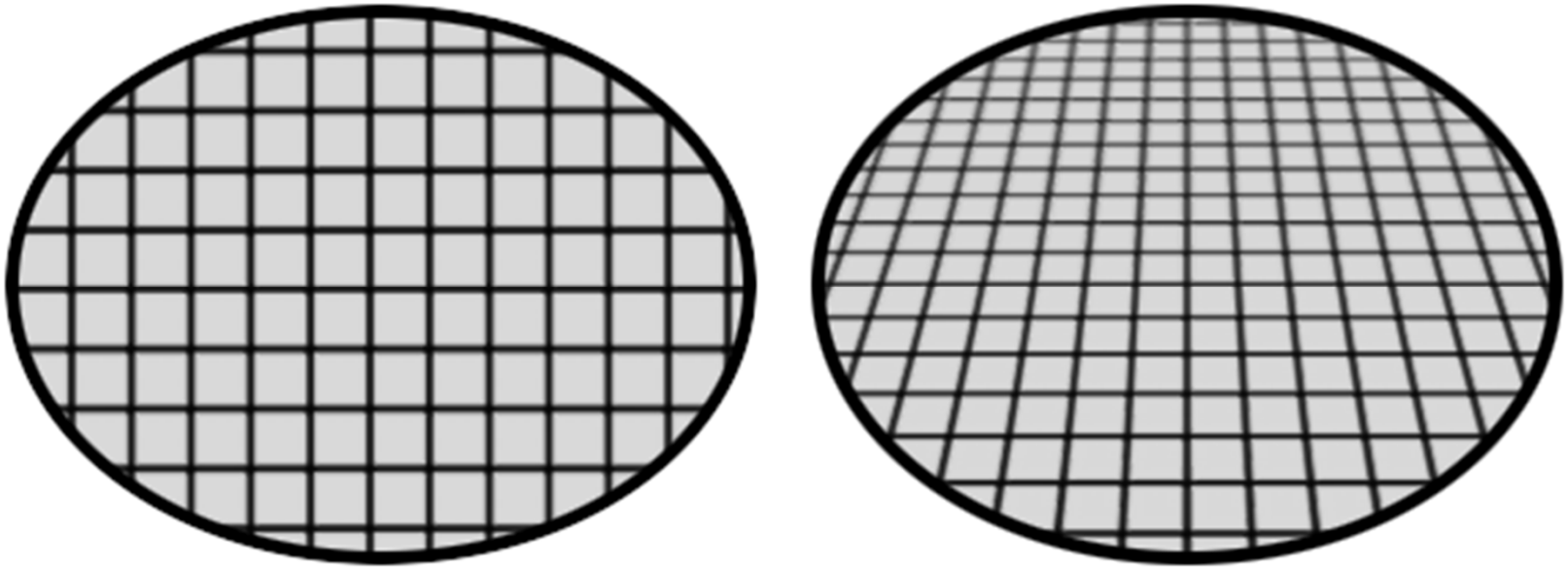
3D WORLDS

- To sum up - Paint the 3D world into the mind of the receiver:
  - Build a mental model with expected behavior.
  - Address the expectations.
  - Avoid contradictions.
  - Build layers of strong consistent cues.

spot the cues?

size occlusion shadows color texture gradient linear perspective

spot the cues?

Other interesting pictures...