



## Visual Cues & Constancies

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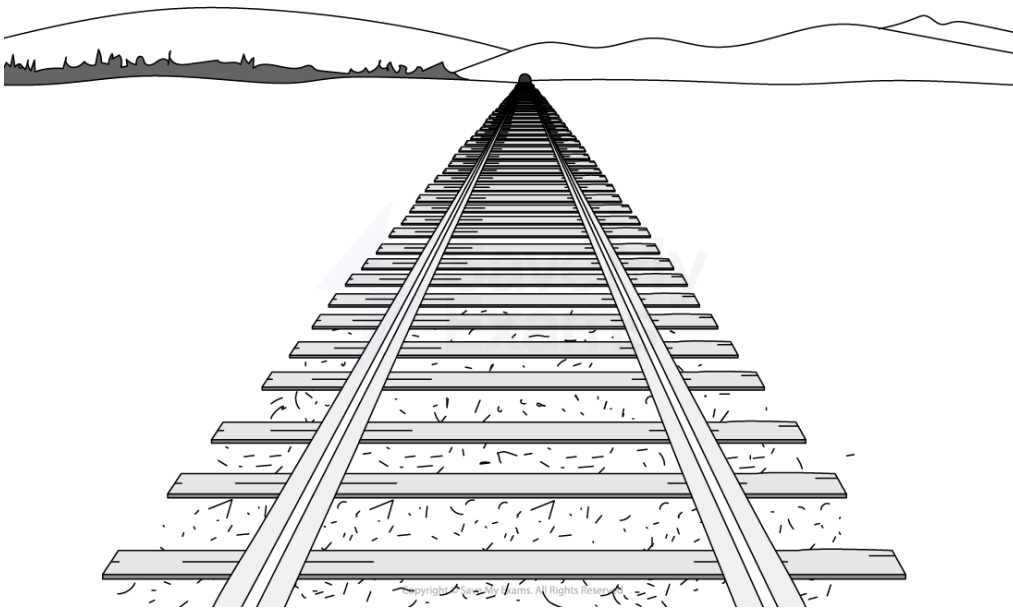
- \* Visual Cues & Constancies: Depth Cues



# Monocular depth cues

- **Depth cues** are made up of information taken from the surrounding **environment** which help humans to understand depth i.e. that the world is 3-D rather than flat and depthless
- A **visual cue** is any environmental **stimulus** which provides humans with information about **spatial dimensions, movement, distance** and **proximity** of objects and people within the **visual field**
- **Visual constancy** is the ability of humans to understand that objects remain the same size even though they may appear **smaller** or **larger** depending on where they are **located** in the visual field (e.g. a cow which is far away in a field appears smaller than cows standing near the fence)
- Humans use a **perceptual system** of visual cues and constancies to enable them to understand depth
- **Monocular** depth cues are those which allow someone to **judge** distance and depth using only **one eye** ('mono' = 'one') i.e. if one eye is covered it is still possible to **understand** that an object is not smaller simply because it is seen in the distance
- Monocular depth cues (which **interpret** the world as being in **2-D**) include:
  - **Linear perspective**: this occurs when parallel lines (such as those on a railway track) appear to **converge** in the distance
  - **Relative size**: the further away an object/person is from the viewer, the smaller they appear in the visual field
  - **Height in plane**: objects/people who are higher up in the visual field appear to be further away from the viewer
  - **Occlusion**: when one object/person is obscured by another object/person they appear further away in the visual field

## Monocular Depth Cue Example

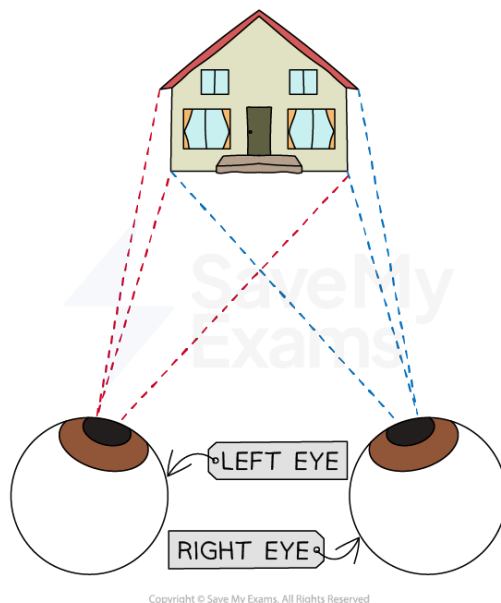


*Linear perspective is a monocular depth cue.*

## Binocular depth cues

- **Binocular** depth cues are those which involve the use of both eyes ('bi' = 'two')
- Each human eye takes in a slightly different view when both are used together and this is what enables human beings to use **depth perception** (see the image below):

### Binocular Depth Cue Example



*Retinal disparity: each eye takes in a slightly different view from the other.*



- Each eye takes in a view that is **processed** by the brain to create a **3-D image**: the fact that each eye takes in a slightly different view is due to **retinal disparity** (if human eyes took in the same view they would have to be stacked on top of each other which would be of no use whatsoever!)
- Objects/people which are further away do not produce as much retinal disparity as those which are closer to the viewer - this is due to **convergence** i.e. the eyes coming together to take in the view
- Both retinal disparity and convergence allow human beings to process and understand depth
  - Animals such as birds have poor depth perception as they are only able to use monocular depth cues due to the placement of their eyes



### Examiner Tips and Tricks

Make sure that you know all of the key terms for both **monocular** and **binocular** depth cues - and don't get them mixed up! Make a table/grid and put it in your planner or above your desk to remind yourself of which depth cues are monocular and which are binocular.



### Worked Example

Here is an example of a question you might be asked on this topic - for **AO1** and **AO2**.

**AO1:** You need to demonstrate knowledge and understanding of key concepts, ideas, theories and research.

**AO2:** You need to apply your knowledge and understanding, usually referring to the 'stem' in order to do so (the stem is the example given before the question)

**AO3:** You need to analyse and evaluate key concepts, ideas, theories and research.

After each featured question there is a 'model' answer i.e. one which would achieve top marks in the exam.



Briefly outline **two** of the monocular depth cues shown in the image above. Explain how each cue you have identified helps us to perceive the distance of objects in this image. [4]

**AO1** = 2 marks

**AO2** - 2 marks

**Model answer:** (remember that you only need to use **two** of the following cues, we have presented you with a choice of several possibilities here):

**AO1:**

- Height in plane is concerned with the position of the objects in the visual field;
- Relative size is how large the same or similar objects appear to be in the visual field;
- Occlusion is concerned with whether objects overlap' linear perspective is the appearance of parallel lines converging;

**AO2:**

- Height in plane - the person on right (walking near the second umbrella down) is higher in the visual field than the person in profile on the right of the image, so we know that the person near the second umbrella on the right is further away than the person in profile;
- Relative size - the people further away in the image appear smaller than those who are in the foreground;
- Occlusion - some of the shops on the right side of the image are occluded by tables and umbrellas so they appear further away; linear perspective - the straight lines of the road appear to converge in the distance;