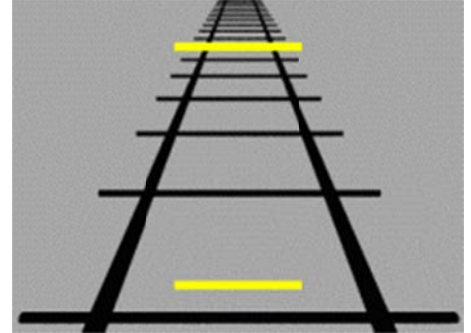


Chapter 5: 2 Illusions

Our text doesn't really discuss illusions, so I wanted to present 2 famous ones along with an explanation for each illusion.

Ponzo Illusion

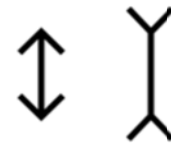
The **Ponzo illusion** is a [geometrical-optical illusion](#) that was first demonstrated by the [Italian](#) psychologist [Mario Ponzo](#) (1882–1960) in 1911.^[1] He suggested that the [human mind](#) judges an object's size based on its background. He showed this by drawing two identical lines across a pair of converging lines, similar to [railway](#) tracks. The upper line looks longer because we interpret the converging sides according to [linear perspective](#) as parallel lines receding into the distance. In this context, we interpret the upper line as though it were farther away, so we see it as longer – a farther object would have to be longer than a nearer one for both to produce retinal images of the same size.



In other words: Since the top and bottom line are in fact equal in length (measure them if you need), they project the same size image on your retina. But your brain also perceives the top line as farther away due to the depth cue of linear perspective. Your brain says "hey, if the top line and bottom one are equal in length on the retina, but the top one is farther away, then it must be LONGER". Because as we know if they were side by side, the brain would recognize they were indeed equal in length because they are the same length. But as the top one moves farther away in the distance its image on the retina should be smaller than the lower line. What if it isn't? Then if we brought it back forward to be beside the bottom line, we would see that it is really bigger/longer.

THE MULLER-LYER ILLUSION

Which of the two vertical line segments in the pic at the right is longer? Although your visual system tells you that the right one is longer, a ruler would confirm that they are equal in length.



How to explain it?

In the three-dimensional world, depth perception concerns judging distance. The closer an object is to the retina, the larger it is on the retina. However, in the two-dimensional world of the Muller-Lyer illusion, our brain makes assumptions about the relative depths of the two shafts based on monocular (pictorial) cues. We are used to seeing edges with "fins" slanting down (as the wall pic on the left) as closer to us. We are used to seeing edges with "fins" slanting up (as the wall pic on the right) as being farther away. And so if you look at the stick figures shown earlier, the right most stick figure looks longer even though it isn't. The brain is saying "if 2 images project the same size image on the retina (they are equal in length and hence do) but one on the right is farther away, then it must be bigger/longer."

