100 THINGS

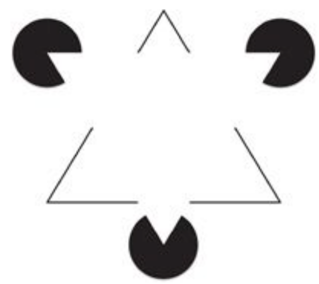
EVERY DESIGNER NEEDS TO KNOW ABOUT PEOPLE

SUSAN M. WEINSCHENK, Ph.D.

1. What You See isn't What Your Brain Gets

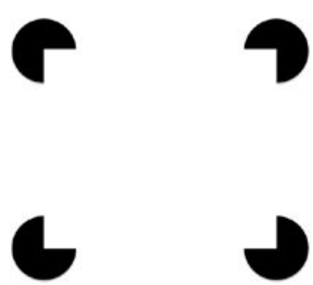
You think that as you're walking around looking at the world, your eyes are sending information to your brain, which processes it and gives you a realistic experience of "what's out there." But the truth is that what your brain comes up with *isn't* exactly what your eyes are seeing. Your brain is constantly interpreting everything you see. Take a look at **Figure 1.1**, for example.

Figure 1.1. You see triangles, but they are not really there



What do you see? At first you probably see a triangle with a black border in the background, and an upside-down, white triangle on top of it. Of course, that's not really what's there, is it? In reality there are merely lines and partial circles. Your brain creates the shape of an upside-down triangle out of empty space, because that's what it expects to see. This particular illusion is called a Kanizsa triangle, named for the Italian psychologist Gaetano Kanizsa, who developed it in 1955. Now look at **Figure 1.2**, which creates a similar illusion with a rectangle.

Figure 1.2. An example of a Kanizsa rectangle



The Brain Creates Shortcuts

Your brain creates these shortcuts in order to quickly make sense out of the world around you. Your brain receives millions of sensory inputs every second (the estimate is 40 million) and it's trying to make sense of all of that input. It uses rules of thumb, based on past experience, to make guesses about what you see. Most of the time that works, but sometimes it causes errors.

You can influence what people see, or think they see, by the use of shapes and colors. **Figure 1.3** shows how color can draw attention to one message over another.

Figure 1.3. Color and shapes can influence what people see

STOP	WAR
PEACE	NOW

STOP	WAR
PEACE	NOW

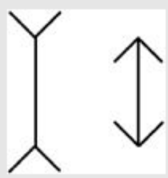
If you need to see in the dark, don’t look straight ahead.

The eye has 7 million cones that are sensitive to bright light and 125 million rods that are sensitive to low light. The cones are in the fovea (central area of vision) and rods are less central. So if you’re in low light, you’ll see better if you don’t look right at the area you’re trying to see.

Optical illusions show us the errors

Optical illusions are examples of how the brain misinterprets what the eyes see. For example, in **Figure 1.4** the line on the left looks longer than the line on the right, but they’re actually the same length. Named for Franz Müller-Lyer, who created it in 1889, this is one of the oldest optical illusions.

Figure 1.4. These lines are actually the same length



We see in 2D, not 3D

Light rays enter the eye through the cornea and lens. The lens focuses an image on the retina. On the retina it is always a two-dimensional representation, even if it is a three-dimensional object. This image is sent to the visual cortex in the brain, and that's where recognition of patterns takes place, for example, "Oh, I recognize that as a door." The visual cortex turns the 2D image into a 3D representation.

The visual cortex puts all the information together

According to John Medina (2009), the retina receives electrical patterns from what we look at and creates several tracks from the patterns. Some tracks contain information about shadows, others about movement, and so on. As many as 12 tracks of information are then sent to the brain's visual cortex. There, different regions respond to and process the information. For example, one area responds only to lines that are tilted to 40 degrees, another only to color, another only to motion, and another only to edges. Eventually all of these data get combined into just two tracks: one for movement (is the object moving?) and another for location (where is this object in relation to me?).