SECOND EDITION

100 THINGS

EVERY DESIGNER NEEDS TO KNOW ABOUT PEOPLE

SUSAN M. WEINSCHENK, Ph.D.

FREE SAMPLE CHAPTER

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Susan Weinschenk

Peachpit Press
www.peachpit.com

Peachpit Press is an imprint of Pearson Education, Inc.
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ISBN 13: 978-0-13-674691-1
ISBN 10: 0-13-674691-8

ScoutAutomatedPrintCode

ACKNOWLEDGMENTS

I am grateful to Jeff Riley, my developmental editor, who helped me with the first and second editions of this book and many other books in between. Thank you to the Pearson team for their support and great work on cover design, graphics, layout, publishing, and distributing.

DEDICATION

Dedicated to the memory of Miles and Jeanette Schwartz. Wish you were here to share the book with.

CONTENTS

THE PSYCHOLOGY OF DESIGN

Whether you're designing a website, an app, software, or a medical device, the more you know about people, the better experience you will be able to design for your audience.

Your audience's experience is profoundly impacted by what you know—or don't know—about them.

How do they think? How do they decide? What motivates them to click or purchase or whatever it is you want them to do?

You'll learn these things in this book.

You'll also learn what grabs attention, what errors people make and why, and other things that will help you design.

And you'll design better because I've already done most of the heavy lifting for you. I'm one of those strange people who like to read research. Lots and lots of research. So I read—or in some cases, re-read—dozens of books and hundreds of research articles. I picked my favorite theories, concepts, and research studies and combined them with the experience I've gained throughout the many years I've been designing technology interfaces.

And you're holding the result: 100 things I think you need to know about people.

Note about the second edition: When I wrote the first edition of this book, I hoped, of course, that it would be a popular, widely read book. But I didn't know if people would respond to it or not. It's been a surprise and a heart warming experience to have the reaction to the book be so positive. The first edition has been translated into several languages and used as a textbook in many universities, and people often show me their well-used book with marks and sticky notes and highlights.

It's been several years since I wrote the first edition, and most of the material has stood the test of time. There is some new research, however, so I decided it was time to do a second edition. I've done updates, and tweaked explanations, wordings, and images, to make sure the book stays current.

A big thank-you to all my readers for your support.

Susan Weinschenk, Ph.D.
Edgar, WI
June 2020

HOW PEOPLE SEE

Vision trumps all the senses. Half of the brain's resources are dedicated to seeing and interpreting what we see. What our eyes physically perceive is only one part of the story. The images coming in to our brains are changed and interpreted. It's really our brains that are "seeing."

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.

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.

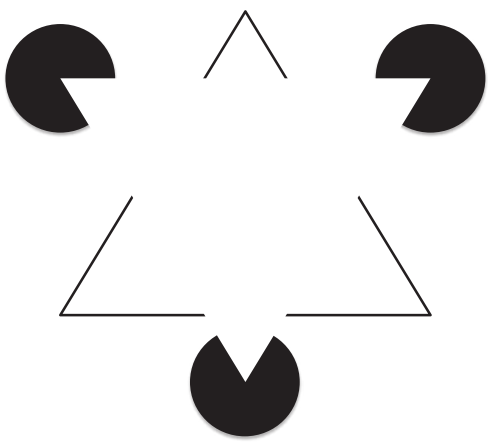

FIGURE 1.1 You see triangles, but they are not really there

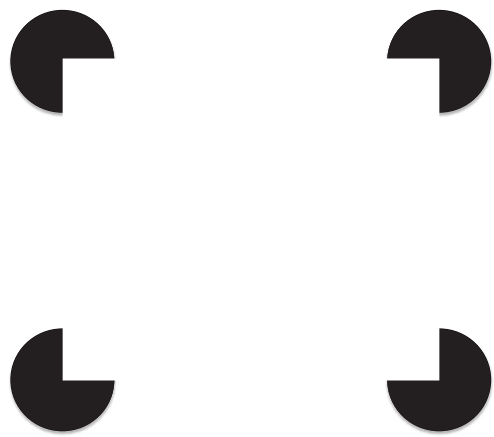

FIGURE 1.2 An example of a Kanizsa rectangle

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.

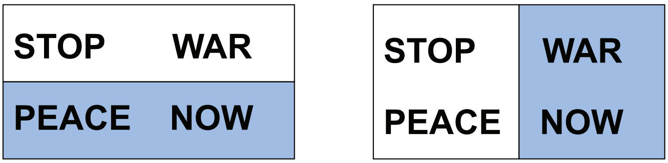

FIGURE 1.3 Color and shapes can influence what people see

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 the 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.

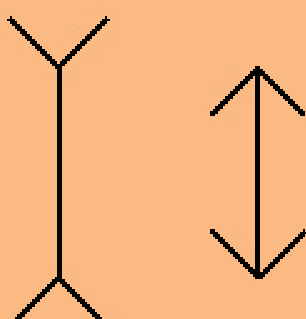

FIGURE 1.4 These lines are actually the same length

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.

Takeaways

- What you think people are going to see when you design a product may or may not be what they actually see. What people see might depend on their background, knowledge, familiarity with what they are looking at, and expectations.
- You might be able to persuade people to see things in a certain way, depending on how you present information and visual elements. You can use shading or colors to make it look like some things go together and others don't.

2 PERIPHERAL VISION IS USED MORE THAN CENTRAL VISION TO GET THE GIST OF WHAT YOU SEE

You have two types of vision: central and peripheral. Central vision is what you use to look at things directly and to see details. Peripheral vision encompasses the rest of the visual field—areas that are visible but that you're not looking at directly. Being able to see things out of the corner of your eye is certainly useful, but research from Kansas State University shows that peripheral vision is more important in understanding the world around us than most people realize. It seems that we get information on what type of scene we're looking at from our peripheral vision.

Why movement on a screen is so annoying

People can't help but notice movement in their peripheral vision. For example, if you're reading text on a screen and there's a video that starts to play off to the side, you can't help but look at it. This can be quite annoying if you're trying to concentrate on reading the text in front of you. This is peripheral vision at work! This is why advertisers use blinking and flashing in the ads that are at the periphery of web pages. Even though we may find it annoying, it does get our attention.

Adam Larson and Lester Loschky (2009) conducted research on central and peripheral vision in 2009, and Loschky conducted even more research in 2019. In the research they showed people photographs of common scenes, such as a kitchen or a living room, or outdoor scenes of cities and mountains. In some of the photographs the outside of the image was obscured, and in others the central part of the image was obscured (**Figure 2.1**). Then they asked the research participants to identify what they were looking at.

Loschky found that if the central part of the photo was missing, people could still identify what they were looking at. But when the peripheral part of the image was missing, they had a much harder time identifying what they were looking at. Loschky concluded that central vision is critical for specific object recognition, but peripheral vision is used for getting the gist of a scene.

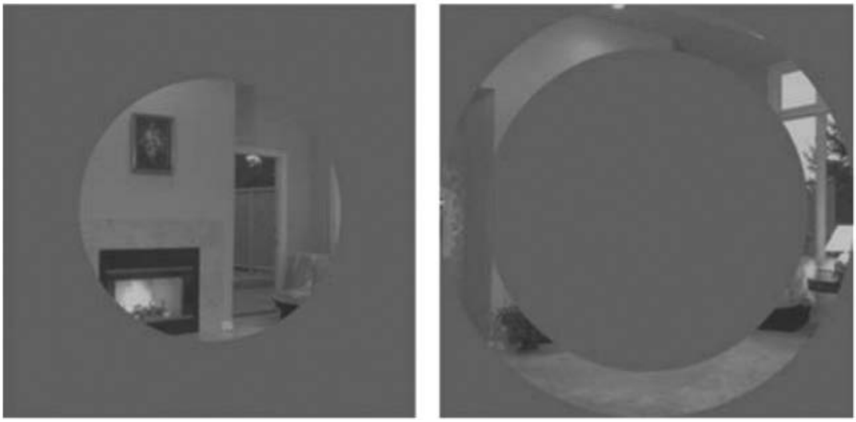

FIGURE 2.1 A photo used in the original Larson and Loschky research

If someone is looking at a desktop screen, you can assume that they are using both peripheral and central vision. The same is true if they are looking at a laptop screen or a large tablet. With mobile screens, depending on the size of the device, it is possible that there is no peripheral vision available on the screen.

Peripheral vision kept our ancestors alive on the savannah

The theory, from an evolutionary standpoint, is that early humans who were sharpening their flint or looking up at the clouds and yet still noticed that a lion was coming at them in their peripheral vision survived to pass on their genes. Those with poor peripheral vision didn't survive to pass on genes.

Additional research confirms this idea. Dimitri Bayle (2009) placed pictures of fearful objects in subjects' peripheral vision or central vision. Then he measured how long it took for the amygdala (the emotional part of the brain that responds to fearful images) to react. When the fearful object was shown in the central vision, it took from 140 to 190 milliseconds for the amygdala to react. But when objects were shown in peripheral vision, it took only 80 milliseconds for the amygdala to react.

Takeaways

- If you are designing for a desktop or laptop screen, you should assume that people are using both peripheral and central vision.
- Although the middle of the screen is important for central vision, don't ignore what is in viewers' peripheral vision. Make sure the information in the periphery communicates clearly the purpose of the page or information they are viewing.
- If you have images of an emotional nature, put them in the periphery instead of in the middle.
- If you want users to concentrate on a certain part of the screen, don't put animation or blinking elements in their peripheral vision.

3 PEOPLE IDENTIFY OBJECTS BY RECOGNIZING PATTERNS

Recognizing patterns helps you make quick sense of the sensory input that comes to you every second. Your eyes and brain want to create patterns, even if there are no real patterns there. In **Figure 3.1**, you probably see four sets of two dots each rather than eight individual dots. You interpret the white space, or lack of it, as a pattern.

FIGURE 3.1 Your brain wants to see patterns

THE GEON THEORY OF OBJECT RECOGNITION

There have been many theories over the years about how we see and recognize objects. An early theory was that the brain has a memory bank that stores millions of objects, and when you see an object, you compare it with all the items in your memory bank until you find the one that matches. But research now suggests that you recognize basic shapes in what you are looking at, and use these basic shapes, called geometric icons (or geons), to identify objects. Irving Biederman came up with the idea of geons in 1987 (**Figure 3.2**). It's thought that there are 24 basic shapes that we recognize; they form the building blocks of all the objects we see and identify.

If you want people to quickly recognize what an object is, you should make use of simple shapes. This makes it easier to recognize the basic geons that make up the shape. The smaller the object to recognize (for example, a small icon of a printer or a document), the more important it is to use simple geons without a lot of embellishment.

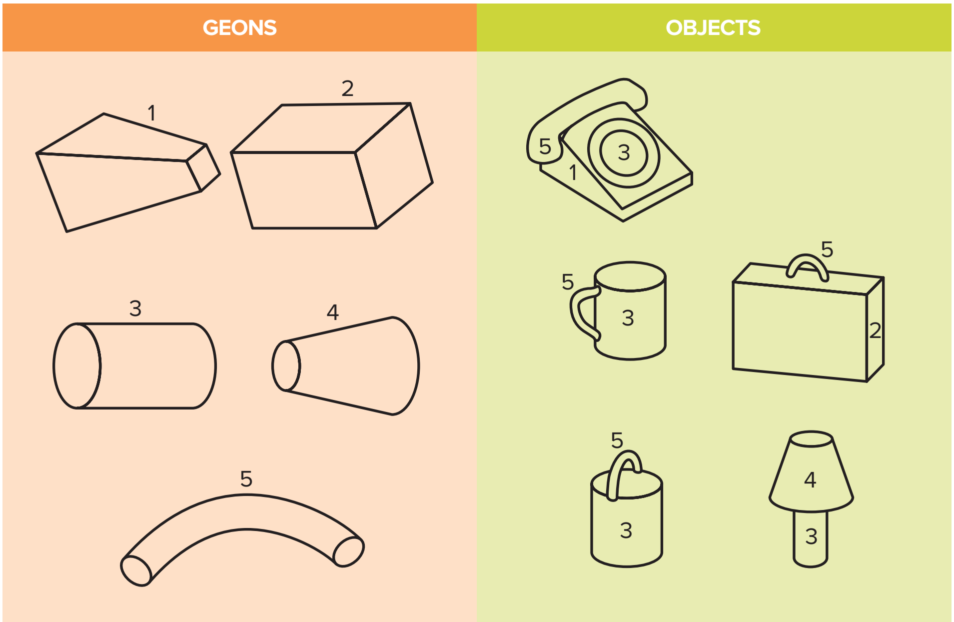

FIGURE 3.2 Some samples of Biederman's geons

Takeaways

- Use patterns as much as possible, since people will automatically be looking for them. Use grouping and white space to create patterns.
- If you want people to recognize an object (for example, an icon), use a simple geometric drawing of the object. This will make it easier to recognize the underlying geons and thus make the object easier and faster to recognize.

4 THERE'S A SPECIAL PART OF THE BRAIN JUST FOR RECOGNIZING FACES

Imagine that you're walking down a busy street in a large city when you suddenly see the face of a family member. Even if you were not expecting to see this person and even if there are dozens or even hundreds of people in your visual field, you will immediately recognize him or her as your relative. You'll also have an accompanying emotional response, be it love, hate, fear, or otherwise.

Although the visual cortex is huge and takes up significant brain resources, there is a special part of the brain outside the visual cortex whose sole purpose is to recognize faces. Identified by Nancy Kanwisher (1997), the fusiform face area (FFA) allows faces to bypass the brain's usual interpretive channels and helps us identify them more quickly than objects. The FFA is also near the amygdala, the brain's emotional center.

This means that faces grab our attention and also evoke an emotional response. If you show faces in your design, on a page or screen, it will grab attention immediately and convey emotional information.

If you want to use faces to grab attention and evoke an emotional response, make sure that the face is facing forward (not in profile), large enough to be easily seen, and showing the emotion you want to convey.

People with autism don't view faces with the FFA

Research by Karen Pierce (2001) showed that people with autism don't use the FFA when looking at faces. Instead, they use other, regular pathways in the brain and visual cortex that are normally used to recognize and interpret objects but not faces.

We look where the face looks

Eye-tracking research shows that if a face in a picture looks away from us and toward a product on a web page (**Figure 4.1**), we tend to also look at the product.

But remember, just because people look at something, it doesn't mean they're paying attention. You'll have to decide whether you want to establish an emotional connection (the face looking right at the viewer) or to direct attention (the face looking directly at a product).

FIGURE 4.1 We look where the person looks

People are born with a preference for faces

Research by Catherine Mondloch et al. (1999) shows that newborns less than an hour old prefer looking at something that has facial features. The FFA's sensitivity to faces appears to be something we are born with.

The eyes have it: people decide who and what is alive by looking at the eyes

Christine Looser and T. Wheatley (2010) took pictures of people and then morphed them in stages into inanimate mannequin faces. In the research, subjects are shown the stages and asked to decide when the picture is no longer a human and alive. **Figure 4.2** shows examples of the pictures. Their research found that subjects say the pictures no longer show someone who is alive at about the 75 percent mark. They also found that people primarily use the eyes to decide whether a picture shows someone who is human and alive.

FIGURE 4.2 An example of Looser and Wheatley's people-to-mannequin faces

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