The Pragmatic Programmers

The Accessible Web

Creating Content for Everyone

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Thank you for taking part in this experiment.

► **Andy and Dave**

Extracted from:

The Accessible Web

Creating Content for Everyone

There are always two people in every picture: the photographer and the viewer.

► Ansel Adams

Chapter 9

A Picture is Worth...

It's no secret that pictures are among of the most powerful tools we have for communication. Images allow us to express complex ideas in a relatively small amount of space. We also know some of our users can't get the message we want to express through images alone. Many people are challenged by difficulties in differentiating colors. In *Stoplights and Poison Apples*, we'll cover some ways to know what our representations look like for our color blind audience as well as make sure we don't use color alone to express our ideas. We'll also learn how to understand the consequence of the contrast of our color schemes by *Thinking in Terms of Black and White*.

We also *must* provide another information access path for users who can't see our images at all. Alternative text representations are one of the fundamental building blocks of web accessibility and we'll discuss using the alt attribute of images *To Put it Another Way*. Sometimes an attribute worth of text isn't enough, however, and when we'll need a few more techniques when we have *More than alt= Can Say*. That covers the basic everyday things we need to understand about providing accessibility for our image content, but, on occasion, a few oddities show up as well. To close the chapter, we'll discuss some of the more common anomalies in *alt.text.odds-and-ends*

26 Stoplights and Poison Apples

I have played hell somewhat with the truthfulness of the colors.

► Vincent van Gogh

As designers, one of our most compelling tools for conveying a message is color. Proper use of color enables us to easily and clearly evoke a perception in the mind of our viewer. The ways in which color is used provide a challenge, however, to the members of our audience who are affected by one of the forms of colorblindness. Do you leave your users in the position of Figure 9.1, on the following page? Less dramatically, consider this: Without the ability to distinguish red from green, how would you suggest navigating a standard traffic light? Would you know whether to stop or go?

An Introduction to Colorblindness

First off, I need to confess to a little deception. In Figure 9.1, on the next page, I've simply changed the photo to grayscale. It illustrates the point, but isn't fully reflective of how colorblind users would necessarily see the apples. Colorblindness, rather than the inability to see any color, is the inability to distinguish differences between certain colors. Generally, we are concerned with three types:

Red-Green Colorblindness

The vision disorders protanopia, protanomaly, deuteranopia, and deuteranomaly are all associated with limitations to the ability to differentiate red from green. Some members of this group also experience a darkening or dimming effect where red becomes indistinguishable with black. Red-green colorblindness is, by far, the most common form of color resolution disability at roughly 7–10 percent of the population, with a prevalence among men by a factor of 20:1.

Yellow-Blue Colorblindness

Tritanopia and trianomaly results in difficulty discriminating yellow and blue tones. Much rarer than red-green colorblindness, yellow-blue colorblindness affects less than 0.5 percent of the population with no discrimination between men and women.

Figure 9.1: Are You Feeling Lucky? Both apples are quite delicious—The green one, however, has been poisoned. Have a nice day.

Total-Colorblindness

Monochromacy is exceedingly rare and is marked by a complete inability to distinguish color hues and possibly by increased light sensitivity.

Prevalence of Colorblindness Types

In our natural environment, red and green often appear with one another. Because of this and of the higher likelihood of red-green colorblindness, we're most likely to encounter difficulties in these ranges of the color spectrum. Because of the rarity of Yellow-Blue colorblindness, fewer issues will occur, but we should be aware of them when we design in those color ranges so we can avoid color dependence and use appropriate contrast. The odds of encountering a user with total colorblindness are extremely low. In fact, awareness of how pages look monochromatically is more likely to be a factor for users who deliberately view pages in monochrome because of contrast needs or equipment limitations.

Simulating Colorblindness

While you can get some information by shifting your monitor settings to grayscale, the best way to check your stylesheets and images for colorblindness problems is to use a simulation tool. Several simulators available for viewing web pages and images, so you'll want to try a few to find one that you're comfortable using. The Colorblind Web Page Filter[1] translates web page stylesheets and images to appear as they would to the various classes of colorblind users. Vischeck[2] is another option that exchanges fewer viewing options for a simpler interface as well as providing a Photoshop plugin to check images during development.

The problem with web-based translation filters is that some parts of your content, like plugin media won't be properly transformed. To get an overall view of the page as it would be seen by a color blind user, you'll want to install a local simulation tool to perform a transformation on your local desktop. Sim Daltonism[3] for OS X and ColorDoctor[4] for Windows are two good options.

Color Keying of Information

The biggest challenge for colorblind users is the use of color keyed information. Certainly for users who can clearly resolve the colors chosen, keying is a valuable tool. The key point is to pick colors that don't resolve too closely for the colorblind. When colors *do* behave badly in a colorblindness simulation, we have three options:

- **Change One of the Conflicting Colors:** Clearly, if possible, it is best to change the color scheme to avoid the color conflict entirely. This might still put a considerable burden on the user, however, who may still need to consider different values of the same hue in order to understand the color keying. For this reason, I prefer to add other cues in addition to preferring non-conflicting color palettes.
- **Add Texture for Clarity:** When texture is added to the color, it provides an additional visual cue to assist the audience in understanding the keying. This may also provide added content clarity for non-colorblind users. Actual texturing of the color doesn't

1. http://colorfilter.wickline.org/
2. http://www.vischeck.com/
3. http://www.michelf.com/projects/sim-daltonism/
4. http://www.fujitsu.com/global/accessibility/assistance/cd/

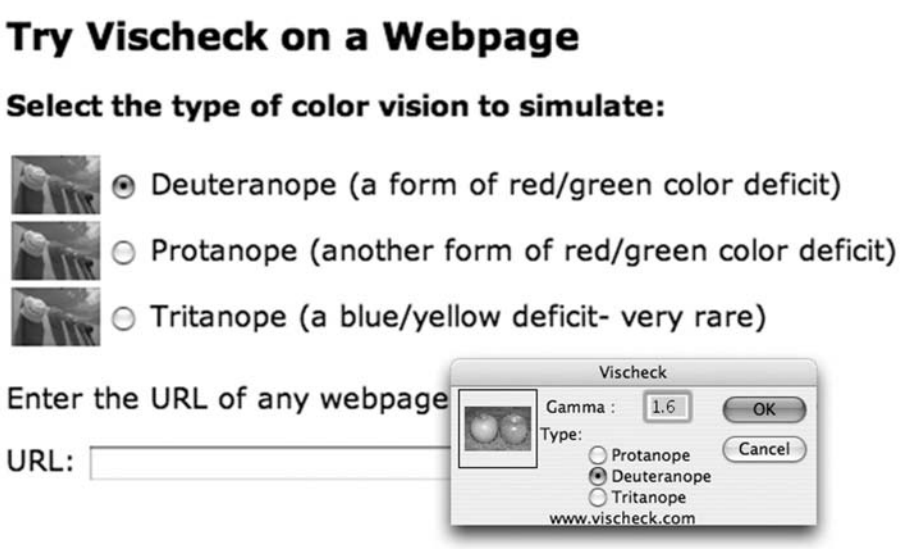

Figure 9.2: HTML and Photoshop Interfaces for the Vischeck Colorblindness Simulator

make sense in all situations, however. For example, if the color keying is used for navigation, then associated symbols or icons should be used to provide alternate cueing.

- **Add Data Information to the Keying Explanation:** If the color keying is used for a chart or another data application, adding summary information gives an alternate access path if the visual representation proves to be troublesome for the user.

Let's consider the progression in Figure 9.3, on the following page, of retooling a chart to minimize the impact of color keying. In sample A, the original color choices (red and green) don't resolve well when color information is removed. For fun, let's assume we can't change the colors outright. By adding a texture to one of the colors, as seen in sample B, the meaning of the chart is made clear. If we couldn't do that either (though I can't image why it wouldn't be possible to do either of these), we could just summarize the data for the user. Even if it's possible to change colors or add textures, this is still a good idea and we've done such in sample C, since it provides one more way for the person reading

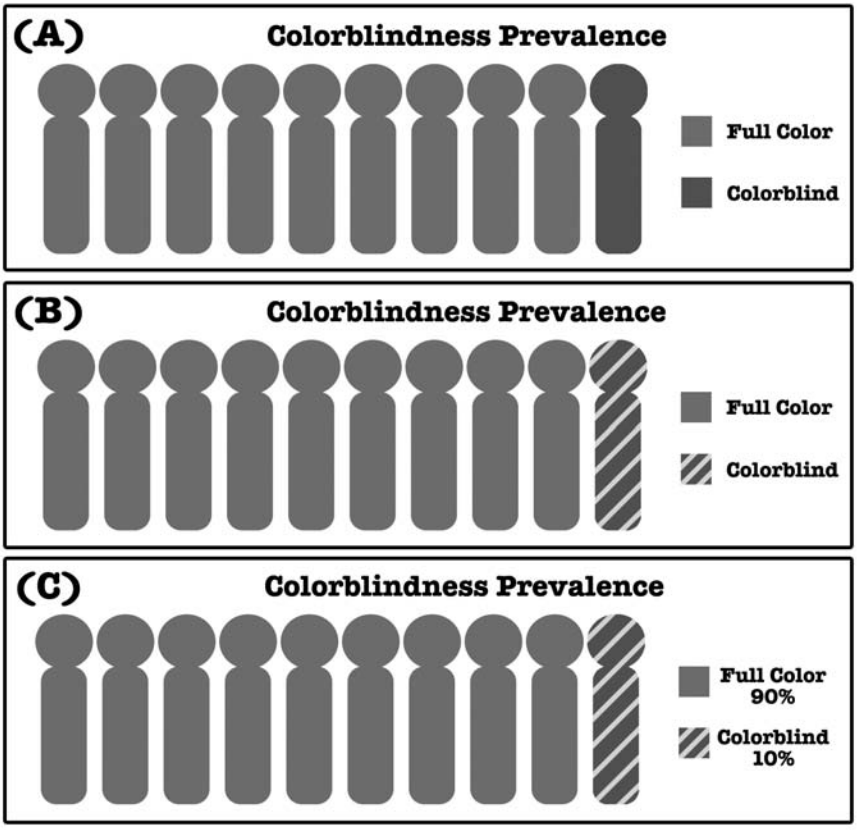

Figure 9.3: Color Keying in Charts: A is unacceptably color keyed, B uses texture to improve the chart, and C adds a data summary. Of course, appropriate alt text should be used in any case.

Color	Hex Value
Red	0xFF9999
Orange	0xFF9900
Yellow	0xCCCC00
Green	0x99CC99
Blue	0x99CCFF
Indigo	0x9999FF
Violet	0xCC99FF

Figure 9.4: This image was constructed with seven hues. Key in the hex values if you don't believe me.

27 Thinking in Terms of Black and White

The color hues we design with pose only one accessibility issue. The *value* has at least as much, if not more, impact on our users' ability to comprehend our work. When color values are too similar, there may not be enough contrast for some users to differentiate between layout elements or resolve the content of images. Some forms of colorblindness as well as low vision disorders such as macular degeneration can lead to contrast resolution difficulties.

To illustrate the problem, lets take a look at a rainbow that I've constructed and reduced to grayscale in Figure 9.4. Notice anything wrong? If it weren't for the labeling and lines, would you clearly see seven colors? In my case, I can only distinguish two grays—one for green and indigo and another for everything else. Clearly, some pretty important information in this figure has been lost. So, what went wrong?

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