

# What is Defective Color Vision?

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Normal perception of color is something most of us take for granted. Color labels we attach to objects such as "red rose" and "green grass" have specific meaning only to people with normal color vision. "Colorblind" is an exaggerated term handed down over time, referring to individuals who have abnormal color vision. The degree to which a person may possess abnormal color vision ranges from slight difficulty in recognizing shades of color to complete loss of color vision. If one is reasonably correct in identifying colors, this slight difference may not be detectable. It is when a person incorrectly identifies a color that these differences become apparent to others.

## What Causes Defective Color Vision?

While the perception of color involves complex activities of the eye and brain, the causes of congenital (from birth) defects of color vision are more simply explained. The retina at the back of the eye contains types of seeing elements called rods and cones. The rods are responsible for night vision and operate under conditions of dim light. The cones are responsible for color vision and operate in daylight conditions. There are three types of cones: blue, green, and red, which act together to allow us to perceive a range of color, from deep indigo to red.

## Are There Other Forms Of Color Vision Abnormalities?

Many people have color vision deficiencies that are not hereditary. For example, aging changes may produce color vision abnormalities. By far the most common color defect accompanies the normal aging of the lens, as in cataracts. In a child, the lens inside the eye is crystal clear, but thereafter the lens gradually darkens, making it difficult for some older people to distinguish dark blues from dark greens, or dark grays.

Some medications may affect color vision. Changes in color vision may also accompany retinal or optic nerve disease. When a color vision problem is suspected of sudden onset, seek help from an eye doctor.

## How Is Color Vision Tested?

There are several ways to test color vision. A common method requires recognition of colored numbers or symbols against a confusing background. If a color test is taken using a colored filter in front of the eye (usually in the form of a red contact lens) it is possible to "fool" the test by making the figures in the colored plates stand out more boldly and achieve a higher score. However, color-sense outside the test situation is not normal. The results of color testing

are not valid when the test is performed using a colored contact lens or filter in front of one or both eyes.

### **Can Anything Be Done About Defective Color Vision?**

Hereditary color vision abnormalities cannot be cured. It is impossible to restore to the eye those elements in the retina which nature did not provide at birth. Some acquired color vision defects may be helped, as with the surgical removal of a cataract. However, wearing a colored contact lens can reduce sharpness of vision, produce severe distortion of 3-D perception and is only minimally effective in helping to recognize and identify most light shades of color with which most people with abnormal color vision have trouble.

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