



# Colour Blindness in a Multi Coloured World: Types, Causes, and Prevalence

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## Description

Colour vision deficiency, also known as Colour blindness, is a visual impairment that affects a person's ability to perceive and differentiate particular colours. It is a condition that can significantly alter a person's educational, occupational, and social experiences throughout the day. The various types, causes, and prevalence of colour blindness are discussed in depth in this study. It is essential to have a thorough understanding of the specifics of colour blindness in order to raise awareness, encourage inclusion, and offer assistance to those who are affected by the condition.

## Types of colour blindness

Colour blindness can be broken down into a variety of subtypes based on the specific colours that people have trouble seeing. The most typical types are:

**Red-Green Colour Blindness:** This type is further divided into two subtypes: protanopia (red-blindness) and deuteranopia (green-blindness). Individuals with these types have difficulty distinguishing between shades of red, green, and sometimes orange.

**Blue-Yellow Colour Blindness:** This type, known as tritanopia or tritanomaly, affects the perception of blue and yellow colours. Individuals with tritanopia have a reduced ability to differentiate between blue and green, as well as between yellow and violet.

**Total Colour Blindness:** This also known as achromatopsia, this is a rare form of colour blindness in which individuals are completely unable to perceive any colours. They see the world in shades of grey.

## Causes of colour blindness

The majority of cases of colour blindness are brought on by inherited genetic mutations that disrupt the normal function of cone colour-sensitive cells in the retina. There may be alterations or deletions in the genes that make the cone photo pigments, which makes it hard to see colours. In either an autosomal recessive or X-linked inheritance pattern, these genetic mutations can be passed down

from one generation to the next. Colour blindness can also happen later in life as a result of certain health conditions, medications, or problems with the eyes. Colour vision can be affected by conditions like diabetes, macular degeneration, and glaucoma. Additionally, changes in colour vision can be temporary or permanent when taking certain medications, such as those used to treat Parkinson's disease or other chronic conditions.

Colour blindness affects a significant number of people worldwide and is relatively common. About 0.8% of men and 0.5% of women are thought to have some form of colour vision impairment. Men are more likely to be affected because men have one X and one Y chromosome, so the most common types of colour blindness are linked to the X chromosome. Colour blindness affects different groups and ethnicity at different rates. The most common type is red-green colour blindness, while blue-yellow colour blindness is less common. The most uncommon form of total colour blindness affects a very small number of people.

## Prevalence of colour blindness

Various aspects of daily life, including educational settings, career choices, and social interactions, can be affected by colour blindness. Colour-coded materials and activities in educational settings can be challenging for colour blind individuals. To ensure equal participation and comprehension, subjects like art, design, and science may require modifications. People who are colour blind may have difficulty in the workplace due to certain occupations that heavily rely on colour differentiation, such as graphic design, electronics, and some medical fields. However, many colour-blind individuals are now able to pursue successful careers in these fields thanks to the availability of assistive technologies, adaptations, and increased awareness. People who are colour blind can greatly benefit from adaptations and accommodations in their daily lives. These include using apps and tools that are friendly to people with colour vision problems, using other ways to identify colours like text labels or patterns, and encouraging inclusive practices in educational and work environments. In the field of colour blindness, ongoing research aims to develop potential treatments or interventions as well as a deeper comprehension of the underlying genetic mechanisms.

## Conclusion

Experimental studies have shown encouraging results in animal models, indicating that gene therapy holds promise as a potential future treatment option. In addition, advancements in technology have significantly assisted colour blind individuals. Colour perception and colour differentiation have been improved through the development of colour correction contact lenses and glasses. Additionally, colour-related task-specific software and smartphone apps have been developed to help people identify colours. A significant number of people are affected by colour blindness, which alters how they perceive particular colours. Promoting inclusivity and providing the necessary accommodations necessitate a thorough understanding of the various types, causes, and prevalence of colour blindness. Future interventions and adaptations that can further support colour-blind individuals in their day-to-day lives are possible thanks to advancements in research and technology.

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