Color Blindness: Psychological Effects

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Abstract

With color deficiency being one of the most common disorders of vision it is important to spread awareness of this invisible disability, so as to provide a greater role in advocacy and assistance. With this in mind, the following paper will define color blindness and provide with a brief explanation of its root causes. Utilizing this information, emphasis is then placed on the psychological effects that color blindness has on an individual’s everyday life; including, educational development and career opportunities.
DEFINITION AND CAUSES OF COLOR BLINDNESS

Before explaining the multiple effects that color blindness can have on an individual, it is important to clarify how it is defined and what causes it. As with many disorders and/or disabilities there are always a few myths and assumptions about what is entailed; for example, many believe that color blindness is simply the inability to see in colors. Thereby, leaving the individual to view their world in only shades of black, gray, and white. This assumption is also made regarding animals, such as cats and dogs. However, these conjectures are far from the truth. In fact, Dargahi, Einollahi, & Dashti (2010) define color blindness as, “is the inability to perceive differences between some colors that other people can distinguish. It is most often of genetic nature, but might also occur because of eye, nerve or brain damage or due to use of chemicals” (p. 172). It is also more common that men will possess this disability as it is congenitally linked to a mutated X chromosome that only men possess one of and women possess two.

COMMON TYPES OF COLOR BLINDNESS

As mentioned prior, color blindness is not simply an individual’s ability to view in black and white only. To be more specific, there are three common types of color blindness. These three types start with a mild inability to discriminate between red, green, and blue. The following are the most common types along with their classification by severity based on the research article “Colour vision deficiency” by Simunovic, M. P. (2010);

- **Anomalous Trichromacy**: Like those with normal colour vision, the anomalous trichromat requires three primary colours to match any other colour. However, the way in which they mix the primary colours is aberrant, such that they will accept colour matches that a normal will not. (mildest forms)
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- Protanomaly = discriminate toward the color Red
- Deuteranomaly = discriminate toward the color Green
- Tritanomaly = discriminate toward the color Blue

- **Dichromacy:** Dichromats have a reduced dimension of colour vision and require only two primaries to match any other colour.
  - Protanopia = discriminate toward the color Red
  - Deuteranopia = discriminate toward the color Green
  - Tritanopia = discriminate toward the color Blue

- **Monochromacy:** colour discrimination is absent. (severest forms)
  - Green-cone monochromacy = discriminate toward the colors Red and blue
  - Red-cone monochromacy = discriminate toward the colors Green and blue
  - Blue-cone monochromacy = discriminate toward the colors Red and green
  - Rod monochromacy and incomplete achromatopsia = discriminate toward the colors Red, green, and blue (p. 748)

LIVING WITH COLOR BLINDNESS

Depending on the classification type, living with color blindness can range from inconsequential to a frustrated habitual lifestyle change to quite precarious. Furthermore, the psychological effects it can have on an individual can also range along the same scale. Ironically, though this disability deals with a person’s vision, it is not a visible disability. Therefore, quite often it goes undetected and untreated; commonly beginning from birth. According to Simunovic, M. P. (2010), “Congenital colour vision deficiency affects as many as 8% of males and 0.5% of females (p. 748).” From a parental or guardian perspective, these are daunting odds to face with regard to a disability that does not begin to display symptoms until the early learning stages are
reached by their child(ren). Moreover, parents/guardians will often have the tendency to want to self-blame as a result of their child’s disability diagnosis. Most often, these feelings are unfounded and are merely an attempt at a coping strategy. That being said, there are a few instances, in which an infant can acquire the disability as a result of non-hereditary causes according to Colour-blindness.com (2013) such as;

- **Shaken Baby Syndrome:** This can cause retina and brain damage and therefore can cause color blindness in infants and children. The damage is permanent so the effects will be carried on into adult life.

- **Trauma:** Similar to above, accidents and other traumas can cause swelling in the visual processing center of the brain – the occipital lobe.

- **UV Damage:** Typically caused during childhood where over-exposure to UV rays causes degeneration of the retina, this is the leading cause of blindness in the world however the damage often only presents itself during a person’s mature years.

The psychological impact on a parent/guardian for one of the aforementioned non-hereditary causes may have a more challenging coping therapy process as they are directly and indirectly related to the actions of the parent/guardian rather than mere genetic chance alone. In the end, in order to increase a child’s chances of having a better quality of life, it is vital that parents/guardians understand what color blindness is and what its causes are. Additionally, they should utilize the information to take cautionary steps to prevent their child from needlessly acquiring it after birth as well.

**PSYCHOLOGICAL EFFECTS**

From an individual perspective, the psychological impacts of living with color blindness can occur on a daily basis. They can often be faced with an internal struggle of whether they
should share their disability with people they know or hide it to blend it. Strong arguments can be made for both views; and when it comes to counseling a person with color blindness, care should be given to what is in the best interest of the client. Keeping that paradigm in mind, it is understandable to be at a loss for resources as a counselor as there is not much in the way of research in the field of psychological or psychosocial effects on people with color blindness. The few psychosocial studies that have been conducted do point out very strong opinions by respondents. In the case of A. Tagarelli, Piro, G. Tagarelli, Lantieri, Risso, & Olivieri (2004) they reported that, “In one of the most important studies in the field they administered a questionnaire to 102 people with defective colour vision and to an equal number of people with normal colour vision. Almost all subjects with defective colour vision reported difficulties with everyday tasks that involved colour and in their current jobs (p.436).” The following subsections will briefly highlight a few areas of an individual’s everyday life and how they are impacted by having a color deficiency disability.

*Education*

As previously mentioned, most often the symptoms of color blindness do not present themselves until the early stages of development in infancy; such as pre-kindergarten and/or kindergarten. At these levels in a child’s education they are learning through visual stimulation such as bright colors and imagery. This can be a very frustrating stage and potentially psychologically damaging as their self-esteem is highly dependent upon their ability to receive praise and through following instructions. Therefore, a child who is colorblind may endure long lengths of time throughout school unable to comprehend why their deficient or experiencing mockery from peers and even teachers. These same effects can occur all throughout an individual’s education career as well. Colour-blindness.com (2013) explains that, “teens may
find themselves in science attempting to identify a chemical reaction or determine a scientific litmus test outcome. As luck would have it, litmus results are often displays of varying shades of purples and greens compared against a reference chart of colors - a recipe for impossibility for most colorblind people.” It is because of these potential psychological impacts that teachers should be educated on the signs of color blindness and possess the necessary skills to assist students struggling with these challenges.

**Cooking**

One of the most common daily tasks that is not easily remembered when imagining life colorblind, is cooking food. However, this can be one of the most risky tasks of a person’s day depending on their color deficiency classification type. What to most individuals is a simple ability to tell when raw food, such as steak, is cooked is not so simple to someone who’s color deficiency effects the color red. Careful consideration and proper temperature control must be taken in order to prevent severe dangers such as food poisoning. On a less severe scale, frustrations can also arise from trying to differentiate between certain fruits and vegetables as they may not have ripened or can look similar, such as tomatoes, grapes, apples, etc.

**Driving**

Similar to the dangers of cooking raw foods, due to the challenge of differentiating the color red, individuals with color blindness can also experience the same dangers when driving a vehicle. Though it is becoming more prevalent that individuals will rely on the positioning of the street lights as opposed to relying on the colors for direction, this trick does not always work. In larger cities and even in other countries, individuals soon find that traffic lights are not universal. In fact, due to modern technology as many as one traffic light can have at least three-five signals on it and they can be hung horizontally as opposed to the more common vertical mount.
EMPLOYMENT

One of the most adverse effects on an individual’s everyday life, particularly one who is experiencing one of the severest forms, is on career opportunities. Entering career fields related to the arts; such as graphic design, marketing, consumer science, culinary, etc., will prove quite frustrating and difficult to someone who is colorblind. Additionally, there are even large areas within the field of civil service that are prohibited to individuals with color deficiencies; such as aviation. There are a few tests administered to detect an individual’s color deficiency(ies); for example, according to Birch, J. (2008), “The Holmes–Wright lantern type A (H-W A) is an occupational colour vision test used by the UK Civil Aviation Authority (CAA) and approved by Joint Aviation Requirements (JAR) to select aircrew (p. 253).” These are just a few examples of the career challenges individuals with color blindness face, and as with any challenge it is important that individuals take the initiative to education themselves on the ways in which they can be better prepared to overcome it and/or find healthy alternate paths around it.

In summary, in order to achieve a more firm grasp on the psychological effects facing individuals with a disability it is first important to understand what the disability is, so as to understand its root causes. In the case of color blindness, its definition is multifaceted and ranges from mild to highly severe color deficiency. Furthermore, while a few of the major life impacts were mentioned in this paper, the effects on an individual’s everyday life come in many forms and are cumbersome. With the goal of providing a greater quality of life for people with color blindness, parents/guardians, teachers, and employers should not presume an individual’s level of severity and should take the appropriate steps to properly educate themselves on how to better provide assistance and support.
References


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