

The Psychological Impact of Light and Color



Light creates more than just visual effects (image, shape, intensity, perception, contrast, etc.); it also has biological and psychological effects that can impact the health and wellbeing of humans.

When light biologically impacts us, it can improve or disrupt our sleep, cognition and overall wellbeing. It can improve mood and stabilize our circadian rhythms, helping us get a better and deeper nights sleep. Psychologically, light can decrease depression scores and even increase cognitive performance such as reaction time and activation.

KAPLAN AND KAPLAN: ENVIRONMENTAL COGNITION

Rachel and Stephen Kaplan, both former professors of psychology at the University of Michigan, have conducted numerous studies on the way humans react to their environments. For this particular subject of lighting and psychology, a study they published titled “The Experience of Nature: A Psychological Perspective” includes some interesting findings that can help us better understand the way light can affect us.

Environmental cognition can be described as a way of processing information in real world settings using memory for geographic locations and finding your way.

Kaplan and Kaplan found that when we are exposed to a new environment, we tend to cognitively try to find a match in our memory that fits the new environment. This helps us interpret and understand a new environment, and might make it seem less daunting or intimidating. Whether it's a building that reminds us of a toy we had as a child or a space that resembles something we just saw a few weeks ago – finding familiarity in the unknown helps us adapt.

This is where lighting can come in. It can be used to highlight building elements, spaces, paintings, textures, etc. that people may find familiar. A brick wall that resembles one in a café a person frequently visits, or a painting that makes you think of the one in your mother's house. Highlighting areas of an environment to help draw people's attention can help them find familiar objects, spaces and structures.

“It is also important that a change in texture or brightness in the visual array is associated with something important going on in the scene. In other words, something that draws one’s attention within the scene should turn out to be an important object or boundary...If what draws one’s attention and what is worth looking at turns out to be different properties, then the scene lacks coherence” - Kaplan and Kaplan, 1988

BRIGHTNESS, HUE AND SATURATION

Brightness, hue and saturation are the three main qualities of light in relation to color. Brightness is the amount of light given off by a light source, usually expressed in lumens or lux. Some studies have shown that brighter light can intensify emotions, while low light doesn’t remove emotions, but keeps them steady. This can lead to people having the ability to make more rational decisions in low light and find it easier to agree with others in negotiation.

Hue is defined as a color or shade. It’s been proven (through various studies) that natural light can make you happier, but colors created by artificial light can also evoke different emotions and have other effects on the body.

Saturation is the intensity of a color. More saturated hues can have amplifying effects on emotions, while muted colors can dampen emotions. In art, saturation is defined on a scale from pure color (100% [fully saturated]) to gray (0%). In lighting, a similar scale can apply.

Blue/white light makes us energetic and can interrupt sleep patterns if exposed to around bedtime — due to the fact that blue light suppresses melatonin levels. Brain cells tend to be the most sensitive to blue wavelengths and the least sensitive to red wavelengths. Blue wavelengths can even have an impact on those who are blind, when it comes to circadian rhythms.

Red/amber light is the least likely hue of light to impact our internal clocks. Red light in the evening can help improve mental health. This is because red light in the evening helps increase the secretion of melatonin which leads to better sleep at night. Better sleep at night leads to improved cognition and overall mental wellbeing.

IMPACT OF COLORS

BLACK: In lighting and interior design, black can be used to portray authority, power, strength, evil, intelligence, thinning/slimming, death or mourning, elegance, formality, mystery, fear, prestigious and aggressive.

GREEN: Also known as the “strength provider,” green is the color of nature. Green light therapy stimulates the creation of growth hormones and strengthens muscles, bones and other tissues. It can also boost your immune system. In lighting and interior design, green can be used to portray nature, growth, cool, money, health, envy, tranquility, harmony, calmness, fertility, safety and ambition.

BLUE: Also known as the “bringer of peace,” blue can be used to lower high blood pressure or to calm people down. It’s also used for light therapies for people who have circadian rhythm disorders. In lighting and interior design, blue can be used to portray trust, loyalty, wisdom, confidence, intelligence, faith, truth, sincerity, cleanliness, air, sky, water, health, tranquility.

PURPLE: Purple light can help reduce emotional and mental stress. Lighting and interior design projects can implement purple to portray royalty, power, nobility, luxury, ambition, wisdom, dignity, independence, creativity, mystery, magic and romance.

RED: In lighting and interior design, red can be used to portray love, romance, gentle, warm, comfort, energy, excitement, intensity, life, passion, danger, leadership, courage and friendship.

ORANGE: Also known as the “source of creativity,” orange stimulates the creative thought process and can help people come up with new ideas. In lighting and interior design, orange can be used to portray happiness, energy, enthusiasm, warmth, wealth, prosperity, sophistication, change and stimulation.

YELLOW: Yellow can sometimes be beneficial in the treatment for depression. In lighting and interior design, yellow can be used to portray happiness, laughter, cheer, warmth, optimism, hunger, intensity, frustration, anger, attention-getting, caution, sickness, jealousy, intellect and energy.

WHITE: In lighting and interior design, white can be used to portray purity, innocence, cleanliness, sense of space, neutrality, safety, beginning, faith and coolness.

CIRCADIAN RHYTHM

Circadian rhythm is our internal clock, impacting our sleep/awake cycle. It influences melatonin secretion, cortisol activity and alertness. As you learned in the previous section, blue light suppresses levels of melatonin, helping us stay awake and alert, while red light increases levels of melatonin, helping our bodies get ready for bed.

When there is a lack of melatonin, people can encounter sleep problems that can eventually lead to behavioral changes. To sustain healthy levels, stay away from blue-hued light towards the end of the day or when you are preparing to go to sleep. This will help levels of melatonin rise, giving you a better night's sleep.

Circadian rhythms can also affect the limbic system. This system regulates a person's feelings of happiness, sadness, anger and other emotions. A disrupted rhythm can negatively affect these emotions and more.

SEASONAL AFFECTIVE DISORDER (SAD)

SAD is a mood disorder that is caused by symptoms of depression during certain times of the year, usually during the winter. It's not exclusive to people who have a history of mental illness and can happen to anyone.

According to the Mayo Clinic, symptoms of SAD include:

- Feeling depressed most of the day, nearly every day
- Losing interest in activities you once enjoyed
- Having low energy
- Having problems with sleeping
- Experiencing changes in your appetite or weight
- Feeling sluggish or agitated
- Having difficulty concentrating

Light therapy is a common treatment method for SAD. There are many types of light boxes that can be utilized, but essentially, you are exposed to a bright light within the first hour of waking up every day. Its purpose is to mimic natural light outside, and studies have shown that it can cause a change in the brain's chemicals, thus impacting moods.

It's usually very effective for most people with SAD, but if light therapy doesn't work, medications and other treatments may be appropriate.

DIRECTION OF LIGHT

The direction of a light source can transform spaces and impact the way people feel in these spaces. Lighting positioned *above eye level* can create a feeling of restraint, creating a more formal atmosphere. On the other side, lighting positioned *below eye level* can provoke a feeling of individual importance, creating a more informal atmosphere.

The chart below from the *Illuminating Engineering Society (IES)* shows various lighting effects and how they can impact a space:

PSYCHOLOGICAL IMPACT	LIGHTING EFFECT	LIGHT DISTRIBUTION
Tense	Intense direct light from above.	Non-uniform
Relaxed	Lower overhead lighting with some lighting at room perimeter, warm color tones.	Non-uniform
Work/Visual Clarity	Bright light on work-plane with less light at the perimeter, wall lighting, cooler color tones.	Uniform
Spaciousness	Bright light with lighting on walls and possibly ceiling.	Uniform
Privacy/Intimacy	Low light level at activity space with a little perimeter lighting and dark areas in rest of space.	Non-uniform

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