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RETAIL

BIOCENTRIC LIGHTING™ IN RETAIL

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The lighting environment in retail plays an important role in creating the right ambiance. The quantitative and qualitative perspectives in lighting design helps to attract customers and influences the time spent in retail environments. This light design has a direct effect on space perception and user behavior. But light is not only for vision. New research has pointed out the influence of light on our physiology. Light affects mood and attention and is also necessary to synchronize the body clock with the solar day.

The alerting effect of light for staff

Light apart from vision has a direct alerting effect on the human brain[1]. This effect is thought to be attained through a newly discovered set of photoreceptors situated in the retinal ganglion cell layer in the eye. This subpopulation of retinal ganglion cells is especially sensitive to colder light with more blue tones.

In retail, staff often work long days in environments without access to daylight. Today's artificial light such as halogen and fluorescent light tubes, are inefficient in providing alertness since they lack the important shorter bluer wavelengths and thus do not activate the ganglion cells. Several studies highlight the importance of light in improving reaction times, alertness and cognition[2,3].

Retail spaces often lack daylight

The alerting effect of short-wavelength light has thus led to the suggestion that light can be used as a non-pharmacological countermeasure for sleepiness and to improve reaction times among employees. It could also be an effective tool in specific demanding work situations where attention is vital.

...and for customers

Not only do staff benefit from the alerting effect of light, but so do the customers. The alerting effect of light is apparent after only a few minutes light exposure[4]. In a study where healthy participants were exposed to 30 min of blue light (469 nm) rather than amber light (578 nm), all showed improved alertness and even had an effect on short term memory[5].

Risk for insomnia with light at night

Working in retail often demands working long hours at night. The circadian sleep-wake rhythm needs to be aligned with light daily so that it does not to fall out of sync with the solar day. In our modern lifestyle, we spend 90% of our time indoors, most of which is spent in insufficient light for synchronization with the solar day. In the evening, the sleep hormone melatonin increases and helps us fall asleep[6] but light at night can suppress the melatonin release which causes insomnia. When we wake up, natural daylight has a suppressing effect on the release of melatonin, making us feel wake and alert.

However, the human circadian system is influenced by prior lighting. Enough light during daytime can thus protect against aberrant light in the evening. In studies by Kozaki et al, 900 lx of white light (4523 K) or 79 lx of bluish white light (9584K) in the first half of the day were enough to protect against 90 min night light exposure (300 lx) that would otherwise have induced a suppression of night-time melatonin[7,8].

Light has a positive impact on mood

Bright light increases the level of vitality and energy. It has been shown in experiments with MRI chambers that light affects areas in the brain influence our feelings[4].

Sufficient lighting is associated with a feeling of happiness while dark lighting induces feelings of depression. Blue-toned white light has shown a direct subjective mood enhancing effect[9] and when adults rate their mood, it is the blue light that is given the highest mood scores[10]. Light can also decrease the intensity of depressive symptoms[11].

Dynamic light

Different light conditions can directly affect parameters important for sleep. Studies among office workers have shown that those who receive light that stimulates the circadian system, especially during the first half of the working day, have an increased sleep quality and reduced sleep onset latency[8].

Taking the knowledge regarding human physiology further, researchers are also investigating the effects of dynamic lighting environments. In one experiment a dynamic lighting environment was shown to be superior to constant light (400 lx 5 000 K) and equivalent to intense light (750 lx 5 000 K) in producing correct answers in a response time task. On top of this, test subjects in the dynamic lighting environment showed higher levels of melatonin at night beneficial for sleep.

According to the authors, this could be because the dynamic light would mimic daylight whereas a constant intensity light would make the circadian sleep/wake rhythm vague. Another interesting fact that the researchers reported was that with dynamic light no “post lunch dip” was seen as was seen in all the other lighting conditions[12].

Lighting as a tool in sales

Lighting is an effective atmospheric stimulus for retail environments that have the potential to influence emotion, mood, cognition and ultimately consumer behavior. Visual senses have a tendency to overcome all other senses and lighting systems should create a desirable place in which to shop, permit accurate examination of the features and qualities of merchandise while minimizing glare problems. In this context, the color rendering index, CRI, is important. This index measures how “true colors” are perceived when illuminated by an artificial light source. Superior lighting systems with high CRI can be used to simulate different lighting scenarios giving customers opportunities to see themselves or a merchandise in the most natural way[13].

Superior lighting can promote goods

Lighting also influences time spent in a store and affects the number of items examined[14]. Inadequate lighting has been reported to negatively affect the shopping experience and highlighting displayed merchandise can increase the time spent in the retail environment[14].

Researchers have found that subtle differences in lighting can be recognized by consumers and that certain lighting levels can have a significantly positive effect on the entire customer experience and could be key in creating customer loyalty[15].

Most studies up to date are made using fluorescent light tubes and halogen lights. The impact of LED lighting and its effect on emotions and attention among customers remains to be investigated.

Summary

- **Many retail environments are lacking light for human biological needs**
- **Light can promote alertness and improve cognition**
- **Light has a positive impact on mood**
- **Sufficient lighting promotes sleep and well-being**
- **Light can be a tool in creation of customer environments**

The retail world is going through an enormous change. Now more than ever, the focus is on creating unique shopping experiences. Lighting within a room influences the perceived atmosphere and also elicits emotions by pure physiological nature. Light must also create conditions that motivate staff and promote health and overall well-being.

The BioCentric Lighting™ (BCL™) solution provides a new set of tools to improve the customer environment. Interior light can be controlled so that it dynamically changes during the day in the way daylight does and provides synchronization with the bodily rhythms.

Light can also be changed in different settings as desired simulating different light variations such as sunset or night. The BioCentric Lighting™ system is easily customized according to the unique needs of the individual setting. Light for health is ever evolving and continues to provide new understandings of the beneficial effects of different lighting environments in any setting, and the BCL™ system is easily adaptable to meet these new insights.

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