
Emotional Lighting

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Background

From simple observations of people going about their daily lives it is clear to see in how they react or cope with events that we all have emotions and we experience emotional reactions to the world around us. When standing at the airport arrivals gate, it is possible in just a few minutes to see a wide variety of emotions from happy to sad or calm to excited, as people wait for their loved ones to arrive. Psychologists have mapped the numerous emotions people feel using multi-dimensional scaling: valence (positive or negative) against arousal (degree of stimulation) [1].

Emotions exist to assist with our survival when faced with needing to appraise a situation quickly and judge whether the occurrence is a dangerous. This is why we may show disgust or contempt at a dirty dustbin (fear of infection) yet elation with a new garment (improve social standing in tribe). These elements of appraisal have been utilized in product design to help designers understand what may trigger the positive or negative aspects of a proposal [2].

The intangible can also cause emotional reactions in people. Social situations, such as a fight breaking out in the street, may instill fear in bystanders in preparation for them to take flight should they need to. Light, as intangible photonic phenomena also induces

emotional feelings in people. The quality of light in a room is often an influencing factor when people appraise the environment. Many retailers are aware of these effects and in the West, the high end stores will have low level warm light whereas a discount store will have bright cold lighting. This will then influence how people appraise these locations and help them judge if it is the kind of establishment for them.



Figure 1 Philips BlueSky mimicking a blue sky view and sunny daylight for environments with limited real daylight

Emotional Lighting

In this section we describe a few examples where emotional aspect of lighting was explored or used.

We start to understand the importance of and mechanisms behind daylight and its effect on how we perform and feel. Exposure to daylight has been associated with many positive health and wellbeing effects such as improved mood, enhanced morale, and lower fatigue. Ironically, in current times we spend most of our time indoors in rooms with no or limited

daylight entrance. Therefore, researchers are looking into electric lighting solutions that mimic the feeling of daylight and several lighting solutions have been developed to re-create the pleasant feeling of a blue sky view and sunny daylight indoors, including the virtual skylight 'BlueSky' by Philips (see Figure 1)[3,4].

Besides the psychological effects of daylight and lighting on people's mood, lighting also has deeper biological effects on the human body such as influencing the circadian rhythm which regulates our sleep-wake cycles. The winter blues or Seasonal Adjustment Disorder (SAD) is also a known effect of having too little light during the darker months of the year. These of course will play a role in how we experience life, our attitude to things around us and thus our emotions. Luminaires exist that are designed to reduce the effects of SAD or to help energize us using certain blue light frequencies and for many people they appear to have a positive effect.

The work of Vogels [5] focused on the perception of light and of light quality. For example, what lighting parameters contribute to an environment being perceived as being cozy or stimulating.

Jumpertz [6] explored the ability of people to judge the emotion of a light source, such as, does a moving spot of light exhibit the traits of being excited or serene. The findings showed that it was possible to differentiate the perceived emotion of a light spot on the arousal scale but not the valence; however, it is still unknown if watching such a spot of light will induce an emotion in people as well.

Tokaya [7] and Benito Padro [8] explored the emotional aspect of lighting as a mean to prolong the usage of a luminaire (see Figures 2 and 3). They've applied a theory of emotional durability that addresses the people's tendency of replacing functional products by creating an emotional bond between the user and the product [9].

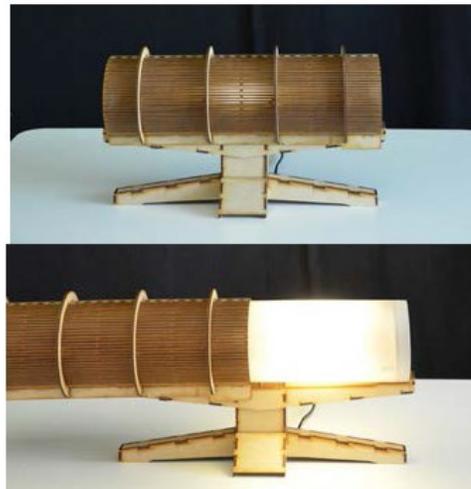


Figure 2. Luminaire where the behavior of the light is affected by the context (sound), developed by Tokaya [7]

There is of course much research on the use of light as a means of signaling or the light parameters needed for enhancing the vision of the elderly or what is needed to make the perfect car headlight beam. While these applications of light will result in an emotional reaction, such as helping an elderly person see, these emotions are consequences of other aspects like being able to

read once again or staying independent or safe on the road, and not of a direct light to emotion correlation.



Figure 3. Luminaire that evolves by continuously depicting the current sound level, developed by Benito Padro [8]

Many art installations, marketing promotions, theatre and stage performances will use lighting to compliment and help drive the emotions of the viewers, much of these are designed using the tacit expertise of lighting designers or artists of which little is then reported or explained. These uses of light are generally well choreographed by experts for that particular unique occurrence which makes it difficult to reapply the methods elsewhere.

Up until now this was not an issue for most people. Home lighting was mostly simple on/off control of a 60

watt lamp and when the need arose for more emotional lighting people would light a few candles. However, with the advent of the LED and connected lighting that can offer color and high quality warm and cool white light, there is the potential for people to benefit from more advanced lighting applications that can enhance and support their lives. This can include the practical such as task lighting where it is needed but also, the move towards lighting that can support us emotionally as well.

We are proposing that there is a growing need to explore more into how different light qualities make people feel. Can artificial light be designed in such a way that it can change the way a person feels or the emotions they can feel?

What new roles could light play in people's lives? Could it help people feel less lonely, or more connected? Could it be used to help lift someone's spirits if they are feeling down – transition lighting from one emotion to another? If we know more about the links between light and emotions we can begin to make experiences more immersive with gaming or play.

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