

Color in Architecture — More Than Just Decoration

Edit Article

Tweet 60 Share 4 Like 47 Send

Archinect 6 days 2 3

Unfollow



By Frank H. Mahnke

Color is an integral element of our world, not just in the natural environment but also in the man-made architectural environment. Color always played a role in the human evolutionary process. The environment and its colors are perceived, and the brain processes and judges what it perceives on an objective and subjective basis. Psychological influence, communication, information, and effects on the psyche are aspects of our perceptual judgment processes. Hence, the goals of color design in an architectural space are not relegated to decoration alone.

Especially in the last eleven decades, empirical observations and scientific studies have proven that human-environment-reaction in the architectural environment is to a large percentage based on the sensory perception of color. These studies include the disciplines of psychology, architectural psychology, color psychology, neuropsychology, visual ergonomics, psychosomatics, and so forth. In short, it confirms that human response to color is total – it influences us psychologically and physiologically.

The American Faber Birren, considered the father of applied color psychology (originator of the OSHA colors) and the first to establish the profession of color consultant in 1936, proclaimed: "The study of color is essentially a mental and psychological science, for the term color itself



Filter by Category:

- » Buildings
- » Architectural Issues
- » Employment
- » Architects
- » Academia
- ↓ More

Search Features

- Editorial & News
- Features
- News
- Events
- Competitions
- Employment
- Community
- Academia
- About
- My Jobs 3
- My Blogs
- Archinect
- Edit Settings
- Log Out

refers to sensation.”

Color is a sensory perception, and as any sensory perception, it has effects that are symbolic, associative, synesthetic, and emotional. This self-evident logic has been proven by scientific investigation. Because the body and mind are one entity, neuropsychological aspects, psychosomatic effects, visual ergonomics, and color’s psychological effects are the components of color ergonomics. These being design goal considerations that demand adherence to protect human psychological and physiological well-being within their man-made environment. The color specifier/designer has the task of knowing how the reception of visual stimulation, its processing and evoked responses in conjunction with the hormonal system, produces the best possibilities for the welfare of human beings. This is of utmost importance in varied environments, such as medical and psychiatric facilities, offices, industrial and production plants, educational facilities, homes for the elderly, correctional facilities, and so forth. Each within themselves having different task and function areas.

### Color Psychology

One of the most striking results concerning color connotations and color mood associations is its consistency cross-culturally from one individual to another and group to group. The great number of studies comparing human subjects worldwide, such as men to women, children to adults, laymen to architects, and even monkeys to humans show that color is an international visual language understood by all.

The impression of a color and the message it conveys is of utmost importance in creating the psychological mood or ambiance that supports the function of a space. A classroom has a different function than a hospital patient room; an office space is not a production line, etc.

To mention a few examples concerning colors and what they convey:

*Pastel yellow* gives the impression of sunny, friendly, soft. The message in the interior space is stimulating, brightness, coziness.

*Red* is arousing, passionate, provocative, fiery, aggressive. The message in the interior is aggressive, advancing, dominant.

*Green* is balancing, natural, calm with the message of simplicity, security, balance.

*White* expresses open, vast, neutral, sterile. The message being purity, sterile, emptiness, indecisiveness.

Obviously this is a very small example since all colors change their character when modified in their lightness factor (light to dark) and saturation.

### Neuropsychological Aspects

A part of neuropsychological investigation is to discover how the brain processes and reacts to sensory information coming from the external world and how this affects humans.

Especially important for the color specifier is the research concerning the presentation of two perceptual extremes within the environment known as sensory deprivation and sensory overload, also termed monotony (or understimulation) and overstimulation. Involved is the reticular formation which always seeks to maintain a level of normalcy, but it can (and will) malfunction. Stress research has shown that states of sensory monotony or overstimulation can trigger dysfunction in the organism.

Monotony sends weak environmental signals and overstimulation confusing signals. Studies have shown that people subjected to an understimulated environment show signs of restlessness, irritability, excessive emotional response, difficulties in concentration, perception disorders, and in some cases, a variety of more extreme reactions.

The basic signs of an understimulated environment are weak intensities of colors, monochromatic harmonies, achromatic colors, weak or monotonous color contrasts.

Overstimulation results in changes in the rate of breathing, increase of pulse rate and blood pressure; increase in muscle tension; psychiatric reactions of varying types; and probably compounded medical consequences, such as increased susceptibility to infection, coronary disease and ulcers. Stress research has shown these symptoms as typical effects on persons who have been subjected to overstimulation.

The basic signs of an overstimulated environment is strong color intensity (highly saturated), color harmonies that are too complex or incongruous, contrasts that present themselves too strong, too many complex visual color patterns.

In a research paper by Dr. R. Küller (Architectural Psychology Department at the University of Lund), entitled *An Emotional Model of Human-Environment Interaction*, it states: “*Actually recent research in the field of neuropsychology indicates that affective responses are faster and more basic than cognitive processes.*”

### Architectural Environments – Emotions and Psychosomatics

Professor for Architecture Sune Lindstrom remarked in 1987: “*With every particular architectural product, it is the spontaneous emotional reaction that is of importance to us.*” The environment



Editorial &amp; News

Features

News

Events

Competitions

Employment

Community

Academia

About

My Jobs 

My Blogs

Architect

Edit Settings

Log Out

produces emotions which in turn is linked to psychosomatics. Psychosomatic medicine emphasizes that physical disorders may originate through psychological factors, be aggravated by them and vice versa. It is common knowledge that stress may cause headaches, anxiety makes the heart beat faster, and anger and distress may affect the stomach, to name the most common occurrences. Of course the list includes high blood pressure, heart palpitations, migraine headaches, eczema, impotence, and so forth.

Scientific research has also established the link to PNI – Psycho-Neuro-Immunology which clearly shows that networks of nerve fibers and molecular bridges connect the psyche and the body with each other and that emotions penetrate completely into the cells of the organism. Henceforth, research indicates that a positive emotional mood strengthens the body's defensive system against illness, whereas a negative emotional frame of mind has a weakening effect.

Relative to designers is the answer given by David Felten (Professor for Neurobiology and Anatomy for the School of Medicine at the University of Rochester, New York) to the question: "When does the interaction between the mind and the body connect?" Felten answered: "The moment we begin to perceive sensory stimulation."

### Visual Ergonomics and Color

Probably one of the least known factors of appropriate color specification is its role in safeguarding visual efficiency and comfort. The eye's adaptation process involves the immediate reaction of the eye to changes in the degree of illumination. Lower light reflectance causes the pupil to dilate, and the reverse is true for higher reflectance. The eye sees luminous density and not the intensity of illuminance. Luminous density is what the eyes receive when light is reflected from a surface (floors, walls, furniture). If the differences between the luminous densities within view are too great, the iris muscle is strained due to constant adjustment, thus causing eye fatigue. Studies have shown that appropriate differences in luminous density can prevent eye fatigue and raise visual acuity, and thus also productivity.

The colors of surfaces absorb and reflect a certain amount of light. These measurements are referred to as light reflection values. Practically all paint companies show them on their color fan decks under LR or LRV.

The international norms are the 3-1 light reflection ratio within a space. This suggests that floors should reflect about 20%, furniture 25-40%, walls 40-60%. The 3-1 designation means the lightest color (60%) divided by the darkest (20%) is a ratio of 3-1. However, visual ergonomists are not color designers. A yellow wall at 60% is not a yellow anymore but a tan. The only solution is if the walls are raised to 75% light reflection for example, so must then be the percentage of floor and furnishings also be raised to insure that there still exists control of extreme contrasts in dark and light. Interesting fact is that if these rules were known by the design community, white walls would not exist – only ceilings are where 80-90% is accepted.

### The Application Gap

In his document D15:81 on the effects of light and color for the Swedish Council for Building Research, Dr. R. Küller wrote: "During the course of this work, it has become evident there is an enormous amount of facts and results that is almost never considered in practice and education. Thus, one finds a gap between research on one hand and practice on the other; the INFAMOUS APPLICATION GAP."

His statement echoes the concerns of the IACC-International Association of Color Consultants/Designers that was founded in 1957 with the participation of approximately 50 architects, designers, artists, educators, psychologists, and scientists from 12 countries. The motivating force being an absence of competent training in the professions that demand the use of color. With the collaboration of recognized national and international experts, an interdisciplinary education/accreditation program was established in Salzburg, Austria under the guidance of Dr. Heinrich Frieling, founder of the Institute of Color Psychology of Germany. It is now known as the IACC Academy for Color and Environment. As to this present day, this program is conducted also in the United States for all international English speaking participants; Milan, Italy, and the IACC Schools of Japan for Color and Interior Design, Nagoya, Tokyo, Kyoto, Fukuoka, Hiroshima, and Sapporo.

Without doubt, the assumption that color is no more than decoration and color specifications can be satisfied or solved by personal interpretations or the following of color trends and design idioms in current fashion is absolutely false and counterproductive. Humane design places the human being in the center of its concern and purpose. Therefore, it should show interest in human welfare and dignity.

### For further Information

Please read [COLOR, Environment, & Human Response](#) by Frank H. Mahnke or/and [Color-Communication in Architectural Space](#) by Meerwein, Rodeck, Mahnke. For the IACC education/accreditation program, see [www.iaccna.org](http://www.iaccna.org).



Tagged **color**

2 Comments

[Back to Top ↑](#)

Editorial & News

Features

News

Events

Competitions

Employment

Community

Academia

About

My Jobs 

My Blogs

Archinect

[Edit Settings](#)

[Log Out](#)

**anf**

[Edit Comment](#)

Jul 23, 12 1:59 pm

Great article... fits in well with the themes and topics being explored over at the Architectural Association's Research Cluster on Colour in Architecture and Urbanism, "Saturated Space" <http://www.saturatedspace.org>

**MODEBRISER**

[Edit Comment](#)

Jul 26, 12 2:28 pm

Interesting to hear more about color theory as an ergonomic study and the lack of empirical, studied applications by designers. Is this a deficiency in education or a deficiency in practice? I.e. is this caused by a lack of understanding or demand from clients or managers? I'm not sure - but I would hazard a guess that it is both.

Especially now that much work occurs inside of closed spaces at a desk for eight hours or more a day, this kind of information may become more and more important to safeguard the health of employees and prevent companies from being sued for making damaging or unsafe work spaces.

Post a new comment as **Archinect**:

Notify me via email about new comments

[Post Comment](#)

[Back to Features List...](#)

[Back to Top ↑](#)

