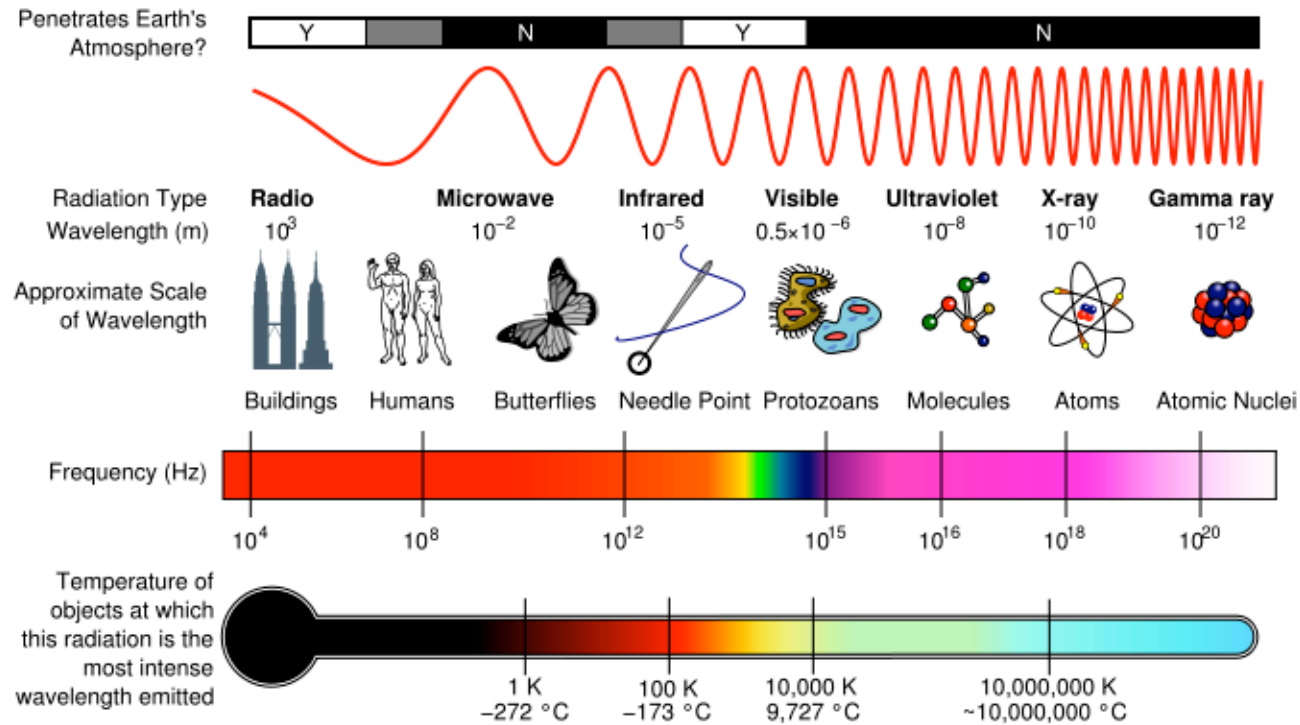


SENSATIONS: SOUND LIGHT COLOR

Designing the nonmaterial for well-being



A project of Steelcase and Charles Morrow Productions LLC



WHITE PAPER

Charlie Morrow, author

A distillation of the ideas in the Forum and overview of research into SOUND LIGHT COLOR designing for wellbeing. Greiner - research. This Whitepaper will be useful for architects, designers and Steelcase global accounts. 10 - 20 pages. See brainstorming section, "Bandwidth for Human Perception."

BRAINSTORM FOR WHITE PAPER, ON-LINE, HANDOUTS 1, 2

Bandwidth of Human Perception -

* from quiet and darkness to loud noise and bursts of light, solid ground to earthquake, cold to extreme heat, calm to stress

range of the senses, speed of processing, response time,

dynamic and automatic brain activity - there is roughly .5 sec difference between an automatic response and one that requires thought.

NEED TO QUANTIFY AND GRAPH

range of sound: 20Hz to 20,000 Hz. Low Frequency is felt, such as rumbles and earthquakes which raise emotions

quiet is an important quality, since it is the base state of auditory mechanism. people who live in noisy places take some time to calm down in very quiet places, and the reverse.

range of heat: -50 to +85 C.

range of light perception - bright sunlight to faint starlight, range of 10 million to one. Color perceptions?

sensitivity to touch, vibration - At what intensity are they felt?

perception of space, gravity, balance, echo-location

ANIMAL COMMUNICATION FRAME

Principals of Animal Communication. Jack H. Bradbury, Sandra L.Vehrencamp
Sinnauer Associates, Inc, Publishers, Sunderland, MA. publish @sinnauer.com

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sound reception is the opposite process from sound production.

sound vibrations propagating in the medium must first be coupled to the organism, modified as necessary, and then converted into useful nerve signals.

frequency range, dynamic range, very fine frequency resolution, very fine temporal resolution very accurate measurement of signal amplitudes, very accurate determination of the angles of a sound source in the horizontal and vertical planes, very accurate determination of the distance to the source, and the ability to monitor very rapid changes in the time domain waveform of signals (pattern recognition).

not surprisingly, it is impossible to achieve ideal conditions for all features in a single sound receiver. Evolutionary investment in one feature invariably curtails perfection in another.

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almost all living are sensitive to light. Plants of course use energy from the sun to grow, and they can turn their leaves in the direction of the sun to maximize their exposure. Even primitive one-celled organisms can orient with respect to the sun and use the overhead directions of the sun to distinguish up from down. the ability to derive directional information from the sun must therefore have developed very early in the evolutionary history of life on Earth. The evolution of eyes that could form an accurate image of objects in the environment and a brain that could analyze the image required more evolutionary time....the capabilities of an animal's eyes certainly affect its use of vision for social communication.

PSYCHOLOGY

WIKIPEDIA:

Psychology: Greek letter 'psi' Portal • History

Brain-computer interface

Brain functions

arousal • attention

consciousness • decision making

executive functions • natural language

learning • memory

motor coordination • sensory perception

planning • problem solving • thought

PERCEPTION

In psychology and the cognitive sciences, perception is the process of attaining awareness or understanding of sensory information.

The oldest quantitative law in psychology is the Weber-Fechner law, which quantifies the relationship between the intensity of physical stimuli and their perceptual effects. The study of perception gave rise to the Gestalt school of psychology, with its emphasis on holistic approach.

What one perceives is a result of interplays between past experiences, one's culture and the interpretation of the perceived. If the percept does not have support in any of these perceptual bases it is unlikely to rise above perceptual threshold.

Perception gives rise to two types of consciousness: phenomenal and psychological. The difference everybody can demonstrate to himself/herself by simple opening and closing his/her eyes. Phenomenal consciousness is full of rich sensations that are hardly present when eyes are closed.

Psychological consciousness is well researched and measured. It occurs half a second after a stimulus starts. If a weak stimulus lasts less, it is unlikely to be perceived. The capacity of psychological consciousness is also well measured. Depending on methods used the capacity ranges between seven and forty symbols or percepts at one time.

There are two basic theories of perception: Passive Perception (PP) and Active Perception (PA). The passive perception (conceived by René Descartes) is addressed in this article and could be surmised as the following sequence of events: surrounding → input (senses) → processing (brain) → output (re-action). Although still supported by mainstream philosophers, psychologists and neurologists, this theory is nowadays losing momentum. The theory of active perception has emerged from extensive research of sensory illusions, most notably the works of Richard L. Gregory. This theory is increasingly gaining experimental support and could be surmised as dynamic relationship between “description” (in the brain) ↔ senses ↔ surrounding.

- Amodal perception
- Color perception
- Depth perception
- Visual perception
- Form perception
- Haptic perception
- Speech perception
- Perception as Interpretation
- Numeric Value of Perception
- Pitch perception
- Harmonic perception
- Rhythmic perception

This confusing ambiguity of perception is exploited in human technologies such as camouflage, and also in biological mimicry, for example by Peacock butterflies, whose wings bear eye markings that birds respond to as though they were the eyes of a dangerous predator. Perceptual ambiguity is not restricted to vision. For example, recent touch perception research Robles-De-La-Torre & Hayward 2001 found that kinesthesia based haptic perception strongly relies on the forces experienced during touch. [3]

Cognitive theories of perception assume there is a poverty of stimulus. This (with reference to perception) is the claim that sensations are, by themselves, unable to provide a unique description of the world. Sensations require 'enriching', which is the role of the mental model. A different type of theory is the perceptual ecology approach of James J. Gibson. Gibson rejected the assumption of a poverty of stimulus by rejecting the notion that perception is based in sensations. Instead, he investigated what information is actually presented to the perceptual systems. He and the psychologists who work within this paradigm detailed how the world could be specified to a mobile, exploring organism via the lawful projection of information about the world into energy arrays. Specification is a 1:1 mapping of some aspect of the world into a perceptual array; given such a mapping, no enrichment is required and perception is direct perception.

The brain, with which you perceive the world, is made up of neurons "buzzing" at 50 cycles a second, while the world as it exists in reality, is made up of electro-magnetic radiation oscillating at 500 trillion cycles a second. This means that the human brain cannot nearly keep up with the 'realness of reality.' To compensate, the brain takes a preconceived idea about the object, then uses those preconceived ideas to see whether or not they are there. The problem with attaining an accurate perception of reality stems from the fact that humans are unable to understand new information, without the inherent bias of their previous knowledge. The extent of a person's knowledge creates their reality as much as the truth, because the human mind can only contemplate that which it has been exposed to. When objects are viewed without understanding, the mind will try to reach for something that it already recognizes, in order to process what it is viewing. That which most closely relates to the unfamiliar from our past experiences, makes up what we see when we look at things that we don't comprehend.

General tau theory considers the organism acting as a unified whole in dynamic relations with its environment, rather than conceiving of the organism as a complex mechanical device reducible into analyzable parts. The theory is firmly embedded in ecological thinking, paying attention to both organism and environment, and drawing information from their forms of interaction. Indeed, generalized tau theory has been developed by thinking specifically about the relational, or ecological invariants in engagements between organism and environment. This whole-systems approach is both ethically satisfying and intellectually illuminating to the extent that it offers not only insight into the nature of living, but also offers pragmatic, human benefits in both designing our constructed world (e.g. in cockpit design) and in therapy of movement disorders (e.g. Parkinson's Disease).

ILLUSIONS

An illusion is a distortion of the senses, revealing how the brain normally organizes and interprets sensory stimulation. While illusions distort reality, they are generally shared by most people.[1] Illusions may occur with more of the human senses than vision, but visual illusions, optical illusions, are the most well known and understood. The emphasis on visual illusions occurs because vision often dominates the other senses. For example, individuals watching a ventriloquist will perceive the voice is coming from the dummy since they are able to see the dummy mouth the words.[2] Some illusions are based on general assumptions the brain makes during perception. These assumptions are made using organizational principles, like Gestalt, an individual's ability of depth perception and motion perception, and perceptual constancy. Other illusions occur because of biological sensory structures within the human body or conditions outside of the body within one's physical environment.

The term illusion refers to a specific form of sensory distortion. Unlike a hallucination, which is a distortion in the absence of a stimulus, an illusion describes a misinterpretation of a true sensation. For example, hearing voices regardless of the environment would be a hallucination, whereas hearing voices in the sound of running water (or other auditory source) would be an illusion.

SENSATIONS

The Analysis of Sensations (1897), Dover Edition, 1959. New York, NY

translation: by C M Williams and Sydney Waterlow. Chapter I.

Colours, sounds, temperatures, pressures, spaces, times, and so forth, are connected with one another in manifold ways; and with them are associated dispositions of mind, feelings, and volitions. Out of this fabric, that which is relatively more fixed and permanent stands prominently forth, engraves itself on the memory, and expresses itself in language.

EXPERIENCE DESIGN

Experience design is the practice of designing products, processes, services, events, and environments with a focus placed on the quality of the user experience and culturally relevant solutions, with less emphasis placed on increasing and improving functionality of the design. An emerging discipline, experience design attempts to draw from many sources including cognitive psychology and perceptual psychology, linguistics, cognitive science, architecture and environmental design, haptics, product design, information design, information architecture, ethnography, brand management, interaction design, service design, storytelling, heuristics, and design thinking.

SOUND LIGHT COLOR

Bibliography and links

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(many more titles and links)