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Optics & Laser Technology 38 (2006) 431–439
Optics & Laser Technology
www.elsevier.com/locate/optlastec

Equal Insistence of Proportion of Colour on a 2D Surface

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Abstract

Katz conducted experiments on Insistence and Equal Insistence, using an episcotister, chromatic, and achromatic papers which he viewed under different intensities of a light sources and chromatic illumination. His principle of Equal Insistence, combined with Goethe's reputed proportions of surface colours according to their luminosity, and Strzeminski's concept of Unism in painting inspire the author's current painting practice. However, a whole new route of research has been opened by the introduction of Time as a phenomenon of Equal Insitence and Image Perception Fading, under contolled conditions of observer movement at different distances, viewing angles, and illumination. Visual knowledge of Equal Insistence indicates, so far, several apparent changes to the properties of surface colours, and its actual effect upon the shape and size of paintings and symbolism. Typical of the investigation are the achromatic images of an elephant and a mouse.

Keywords: Equal insistence; Proportion

1. Definitions

Brightness: A perceptual attribute—an area appears to emit, or reflect, more or less light [1].

Episcotister: A rotating sectored disk used to produce square-wave flickering stimuli [2].

Equal Insistence: When two surface colours seem to attract one's attention equally.

Equiluminance: Surface colours of equal lightness.

Insistence: Degrees of difference in brightness between two colours, one of which "seems to possess the power of catching the eye more readily and of holding it more steadily" [3].

Lightness: Thus lightness can be described as relative brightness. Its colorimetric equivalent is luminance [5, p. 444].

Luminance: The intensity (power weighted by the overall spectral sensitivity of the eye) per unit area of a light source [4, p. 444].

Luminosity: A Commission Internationale d'Éclairage term for "relative luminances, called luminosities, of equal amounts of energy at various wavelengths" [5].

Metamers: Surface colours whose spectral reflectance distributions differ, appear visually identical under one light source, but not under other light sources. Their appearance also differs according to the colour vision of observers, viewing angle, and size.

Time: The temporarily dependent neuro-physiological effect of Image Perception Fading, defined as the apparent disappearance and emergence of images by fusion and change of colour, shape, size, brightness, and texture, under different viewing conditions (Sec). In this paper, this parameter is always used as an upper case initial.

2. Introduction

This study addresses the issues of the meaning of Equal Insistence of surface colour, its derivation, and relevance to Image Perception Fading. Newton's colour wheel, in the Science Museum, London, displays tints of

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0030-3992/$ - see front matter © 2005 Elsevier Ltd. All rights reserved.
doi:10.1016/j.optlastec.2005.06.004

seven surface colours based on the ratio of wavelengths of the visible spectrum which, when spun, appears as a dull white. The act of spinning is significant, because it introduces the temporal effect of perception. However, this is a neuro-physiological effect. The significance of this effect is that lightness of still surface colours, when spun, appear as the largest area of brightness and, by implication, luminosity, and that it is produced by *apparent* fusion of smaller areas of darker surface colours. Added to this are the absolute proportions which Goethe is reputed to have assigned to surface colours dependent on their luminosity [6]. Itten, for the purposes of harmony, produced a colour wheel based on their reciprocals. He also provided caveats that apply equally to his Seven Contrasts of Colour and to Equal Insistence of Proportion: (a) dyes and pigments sold under the same name vary widely, and (b) Contrast of Extension (Proportion) should be left to an observer's vision. Feisner [7], sub-title of Fig. 7.11 as "The relative proportions of computer-generated hues showing the notations devised by Goethe." These show white as the largest proportion of 10, followed by the hues, and ending with a proportion of 0 for black. As Feisner [7] continues, "One way to use color in satisfying proportions is to employ white and warm hues over small areas, and black and cool hues over large areas." As Feisner [7] also states, "A small amount of a pure hue, for example, may be used to balance a large area of a dull one." These proportional uses of surface colours need further scrutiny, however, when the principle of Equal Insistence of Proportion is operated in daylight conditions. Its visual impact, for example, can be measured when achromatic images of an elephant and a mouse are displayed on a white background and observed in normal daylight conditions, see Fig. 1. It is the experience of painters that neither red nor black pigments should be mixed in large quantities with other pigments, otherwise they dominate mixtures. It is considered bad practice to mix a light pigment into a dark pigment. It is good practice to mix small quantities of dark into lighter pigments. Such empirical practices inform experiments in Equal Insistence of Proportion. Comparison between one of Mondrian's studies [8], as in Fig. 2 that typifies "the equivalence of the dissimilar"

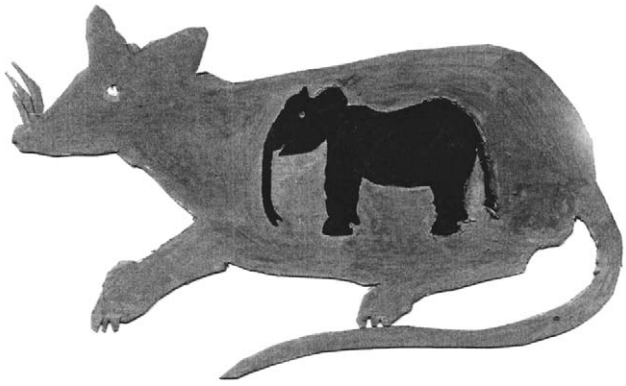

Fig. 1. Staig-Graham—Equal Insistence of Proportion of mouse and elephant images. Gouache.

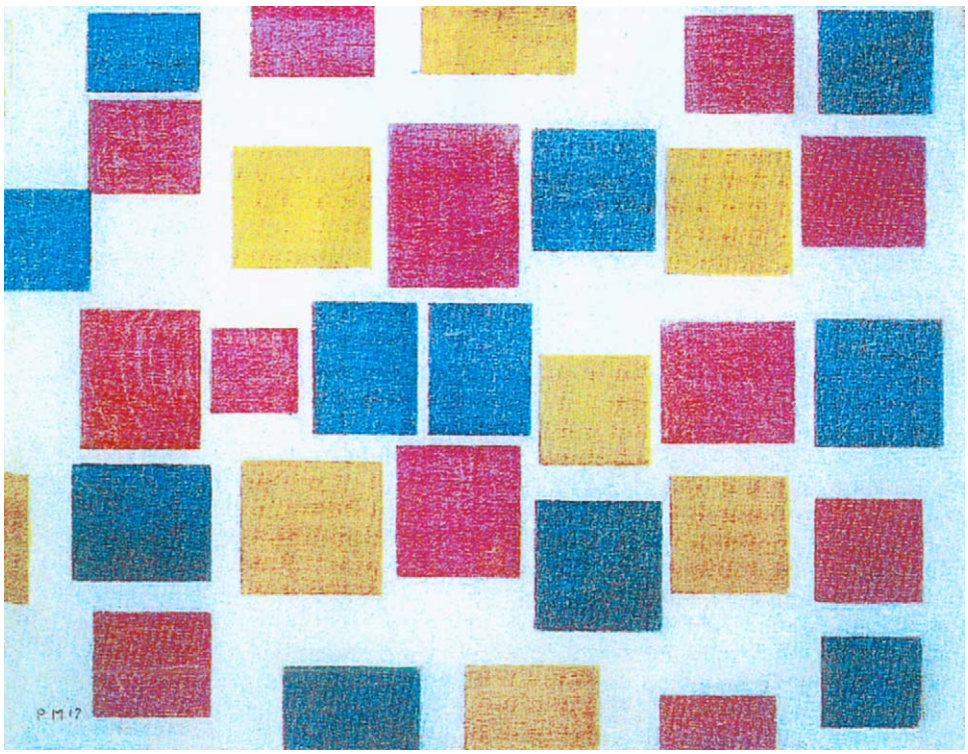

Fig. 2. Mondrian—Composition with Colour Planes 3, 1917, Oil on Canvas.