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COLOR

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It. *Colore*; Fr. *Couleur*; Germ. *Farbe*; Span. *Color*. The notion of *color* refers both to the sensation determined by the action of light emissions of different spectral composition (subjective color), and to the light itself (objective color), which can be monochromatic (simple) or polychromatic (composed), depending on whether electromagnetic radiation has a single or various wavelengths. The study of colors can therefore be approached both from a physical point of view, relative to their spectral composition, and from a physiological point of view, relative to the sensation of color we experience. The discipline that deals with the psychological aspect is *colorimetry* (or *chromatics*). From a physical point of view, electromagnetic radiation whose wavelength (λ) stands between 800 and 400 nm (nanometers) approximately, gives rise to a particular color sensation in the human eye (simple objective colors). The simple objective colors are infinite, given the continuity with which the wavelength varies; however, seven colors are identified as fundamental. As the wavelength decreases, it gives rise to this sequence: red, orange, yellow green, light blue (or blue), indigo, violet. These colors are the components of the solar spectrum and from their fusion (as demonstrated by Newton's disk) sunlight, or white light, is obtained. The pairs of colors whose combination produces a grayscale color (black or white) are called complementary colors.

THE CONTEMPORARY DEBATE

Any investigation or discussion on color preliminarily addresses the question of the objective or merely subjective nature of color. With regard to its objective nature, it is necessary to decide whether color is an irreducible quality *per se* or a quality of the objects. With regard to its subjective nature ("color is in the eye of the beholder"), it is necessary to clarify the relationship between the phenomenology and ontology of color. From the modern age (Galileo, Newton, Descartes, Locke) to more recent times, research on color

has constantly moved between two opposed theoretical positions: Realism and Eliminativism (or Fictionalism).

According to Realism, colored objects exist and color is a physical property of objects (roses and poppies are red, lilies and daisies are white, and so on); however, there are different ways of conceiving those properties: Reductionism and Primitivism. Reductionism claims that colors are identical to, or reducible to, physical properties. There are two forms of Reductionism. The first tries to explain how physical properties affect the perceiver and give rise to the impression of color (McGinn 1983; Cohen 2004). This theory, Dispositionalism (or response-dependent reductionism) is rooted in Locke's famous distinction between primary and secondary qualities: color perception is the response to some stimuli provided by objects, which cause our mind to decipher those stimuli in terms of color. According to Dispositionalism, the color "blue" would only be the arrangement of the objects to ensure that *in a certain perceiver under certain conditions*, some particular rays of light are perceived as "blue". McGinn advanced this position in 1984 and revised it in 1996. This position is realistic (and not subjective) because it refers to the dispositional abilities of objects to produce the sensation of color. A variant of this theoretical position, Relationalism, defends the view that "colors are constituted in terms of relations to perceiving subjects and perceptual circumstances" (Cohen 2009).

The second theory, Physicalism (response-independent reductionism), claims that the physical qualities of objects exist independent of the perceiver. In its most popular version those qualities coincide with the reflectance properties of the objects and with the capacity of an object's surfaces of altering incident light (Jackson, Pargetter 1996; Byrne, Hilbert 2003). Reflectance refers to the disposition of surfaces to reflect specific light percentages specified for each wavelength within the visible spectrum. "On this view, just as water is H₂O, the colour orange is a certain reflectance property" (Pautz 2009: 151). According to Physicalism, the white color of the lily remains such even if there is no mind looking at it. This position is rooted in Thomas Reid's theory of vision and is supported by authors such as Tye (2000) and McLaughlin (2003). However, Reductionism raises several theoretical questions and has been subjected to severe criticism. Explaining color as a *qualia* of the external world, for example, does not allow for any experimental verification. Such efforts are "attempting to identify a real phenomenon in the world which corresponds to a conception to which no real phenomenon does, nor even could, correspond" (Levine 1998).

A realistic perspective that tries to avoid the drawbacks of Reductionism is Primitivism (Campbell 1993; McGinn 1996; Watkins 2005; Gert 2017). Because it admits that color is a property of objects, Primitivism is a sort of realism but, unlike Reductionism, it argues that color is a physical property *sui generis*, an original quality of the *realia*, such as shape or weight. Color cannot be identified with the reflective properties of surfaces, reduced to anything else, neither be subjected to further analysis. Primitivists can be either realistic or unrealistic. The former believe that objects actually have primitive colors (Campbell 1993; Yablo 1995); the latter hold that color is a primitive quality, but deny that it is possessed by objects, which we see as colored simply due to the illusion of color (Chalmers 2006).

In contrast with Realism, Eliminativism denies that physical objects are colored or have properties that coincide with color. A leaf of grass, in this case, is not green even when a mind is looking at it. Among the eliminativists, Hardin (1988), who is one of the promoters of the “scientific turn” in contemporary studies on color, reduces color to neural properties of the brain that we project onto external objects. This position has been subsequently defended by some recent theorists (Maund 1995; Brogaard 2012). However, others (Mackie 1976) believe that colors are properties that no object possesses and that only exist in the realm of our experiences.

OTHER AESTHETIC PERSPECTIVES

The most recent aesthetic debates on color connect various and different points of view: perceptual (color as sensation), empirical (regarding the type of experience that is determined by color and its connections with aesthetic pleasure), anthropological-evolutionary, and symbolic-sociological. Research on the perceptual aspect of colors has been led by Newton, Goethe, and Thomas Young, who examines the physiology of color and the trichromatic theory of vision in his *Course of Lectures on Natural Philosophy and the Mechanical Arts* (1807). Similar research was later taken up by Hermann von Helmholtz in *Handbuch der physiologischen Optik* (1867), which tried to demonstrate that the sensation of color depends on retinal, neurological and cerebral factors, as confirmed in falsificational terms by color-blindness (daltonism) and acromatopsy. Many of the pictorial experiments carried out by divisionist and pointillist painters in the second half of 19th century were inspired by Michel Eugène Chevreul, who invented the famous *cercle chromatique* and expounded the principle of “simultaneous contrast”, concerning the increasing brightness obtained by the combination of two complementary colors. In turn, the painter Josef Albers in his *Interaction of colors* (1963) warns: “In visual perception a color is almost never seen as it really is – How it is physically. This is the fact that makes color the medium more relative in art. To use color effectively it is necessary to recognize that color is constantly deceiving” (Albers 2013: 1). For Albers, each color is dependent on the context in which it stands, since it is precisely the context that changes its nature and our perception. At the core of his study is not the ontology but the *behavior* of color.

From the anthropological point of view, the Proceedings of the 2008 International Conference on geoarchaeology and archaeomineralogy address the fascination that dyes and pigments exerted on primitive man. In particular, Gaydarska and Chapman (2002: 63) establish a close connection between “distinctive colors, brilliant surfaces and ritual power and potency”. Jones and MacGregor (2002) and Saunders focus on the relevance of color in archaeological research. Saunders points out that “making shiny objects was an act of transformative creation, trapping and converting [...] the fertilizing energy of light into brilliant solid forms” (Saunders 2003: 21). So much so that they become objects of social prestige, centrally located in the symbolic representation of political power and élite status.

Batchelor’s *Chromophobia* (2000) offers an aesthetic and sociological account of how the fear of color in Western society has given raise to many cultural prejudices about color. Finally, many surveys have tried to establish a connection between well-being and colors, but at the moment “there are no direct linkages between particular colors and health outcomes of people. No sufficient evidence exists in the literature to

the causal relationship between settings painted in particular colors and patients' healthcare outcomes" (Brent Tofle *et al.* 2002-03: 4).

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