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Narrative Colors

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Abstract • The specific function of colors as a resource for meaning making in the humans' life contexts points out their conceptual definition and use within culturally and socially embedded practices. Color is commonly a natural component available throughout all types of culture design and production processes - i.e., a resource for meaning making e communication equal alongside others. The contemporary scientific research analyzing the color effects on behavior confirms the main influence of the colors, each of which triggers very specific emotional states. For example, a storytelling with a dominant red color presence has themes and characters that are powerful, vigorous, defiant, anxious, angry, or romantic. Exploring the origins of the color as an abstract concept and considering it as one of the main links between culture, language and thought, it's possible to define how, why, and where a color influences the humans existence, the sequential thinking of our memory, that is our life narration.

Parole chiave • Colors' language definition; Theory of colors; Basic Color Terms; Light and Dark; Blue; Period Eye; Perceptual Attention

Abstract • La specifica funzione dei colori come risorsa per la creazione di significati nei diversi contesti della vita umana sottolinea la loro definizione concettuale e uso all'interno di pratiche incorporate culturalmente e socialmente. Il colore è una componente naturale disponibile in tutti i tipi di produzione e progettazione culturale – cioè, una risorsa di semantizzazione e comunicazione pari ad altre. L'attuale ricerca scientifica degli effetti dei colori sul comportamento conferma la loro fondamentale influenza, dove ognuno di essi innesca stati emotivi molto specifici. Ad esempio, uno storytelling con una presenza dominante di colore rosso ha temi e personaggi potenti, vigorosi, provocatori, ansiosi, arrabbiati o romantici. Esplorando le origini del colore come concetto astratto e uno dei principali collegamenti tra cultura, lingua e pensiero, è possibile definire come, perché e dove un colore influenza l'esistenza umana, il pensiero sequenziale della nostra memoria, ovvero la narrazione della nostra vita.

Keywords • Definizione del linguaggio dei colori; Teoria dei colori; Termini base dei colori; Chiaroscuro; Blu; Period Eye; Attenzione percettiva

Ledizioni

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Cultural theory of colors: language and time

The human species' evolution, as well as gender and cultural differences, are just some of the research areas in which scholars have ventured looking for a universal theory of colors. For example, what's the explanation for the predilection of the pink color evidenced in adults and children all over the world?[1] Firstly, it is the evolutionarily function of the color in the emotional states' perception and communication – e.g., for the infants the main means to communicate and express themselves with the outside world is through the facial coloring. But many studies have shown today how, beyond the greater ease in distinguishing between inter-category colors – that is, belonging to different categories such as red, blue and green – rather than intra-category colors such as yellow, red and orange - the perceptual categorization of color in adults, compared to children, is mostly guided by linguistic aspects.[2] In fact, the adult seems to make more use of the right eye perceptive field – i.e the left hemisphere, credit with the linguistic functions - in color perception tasks, while this differentiation is not detected in the children. Therefore, it is essential to recall the crucial research carried out by the linguists Brent Berlin and Paul Kay, focused on finding a universal colors' semantics. Comparing 98 linguistic systems, with particular reference to 20 of them (widespread in every language continent, from English to Swahili, from Japanese to Hungarian), the two scholars discovered that all languages are endowed with psycho-physiological prototypical elements.[3] Contrary to the Sapir and Whorf's linguistic relativism, according to which the language would be conditioned by the context, Berlin and Kay formulated the hypothesis that verbal languages took charge of the chromatic environment according to seven evolutionary stages, found in all linguistic systems. In the beginning there was only the distinction of black and white – dark and light – and all the rest colors were classified on the basis of the only distinctive trait – brilliance (light) versus opacity (dark). At the second stage emerged the red as a color including a vast chromatic area (yellow, brown, orange, pink, purple). The subsequent reduction of the black and white representation areas brought out the green (including blue) and / or yellow (including brown). The fifth step was the account of yellow / green followed by the detachment of blue from green, the progressive definition of red (i.e. red in its current meaning), of white and black as neutral colors or not colors, while at stage six emerged brown and at the seventh one the residual colors (gray, pink, orange, purple).

Let's dwell on the first and the second stages, which represent the main and founding framework of all the color-naming processes. Everything coagulates around black, white

[1] Chloe Taylor *et al.*, *Color preferences in infants and adults are different*, «Psychonomic bulletin & review», 20, 5, 2013, pp. 916-922.
[2] Anna Franklin *et al.*, *Categorical perception of color is lateralized to the right hemisphere in infants, but to the left hemisphere in adults*, «Proceedings of the National Academy of Sciences», 105, 9, 2008, pp. 3221-3225.
[3] Brent Berlin, Paul Kay, *Basic Color Terms, Their Universality and Evolution*, Berkeley, University of California Press, 1969, p.18.

and red. In fact, the first in stage refers to an achromatic system, namely the entire chromatism is reduced to the dichotomy of light (brilliance), indicated with a word referring to white (including yellow, green, and orange red exemplary from sunrise), and darkness (opacity), indicated with a word referring to black (including brown, dark blue, red exemplified by blood). In short, initially the presence or absence of light constitutes the only distinctive trait, the founding split with respect to which the chromatic scale seems secondary and irrelevant to be named. The clarity of the day and the darkness of the night – in their incessant alternation – start to host a third color area only late, that is the definition of the red color through a lexeme that often coincides with the word "blood". The Berlin and Kay studies confirm, therefore, how black, white and red preside over the symbolic-ritual constitution of human perceptive patterns.

Context color genesis

It is observable, beyond evolutionary theories and the identification of universal laws, how the relationship between man and colors has developed through another perspective, equally explanatory and heuristic: the one that traces the stages of the historical and artistic human evolution. Consider, for example, that Homo Sapiens Sapiens began to create and use colors 'only' 200,000 years ago, and he did so for functional preservative and not decorative purposes. He covered his body, clothes and utensils with a reddish earth shade, so that he could camouflage himself and eventually amalgamate with his surroundings, making himself invisible both to predators and to the potential prey he was going to hunting. Blending with the environment through camouflage: this is the dogma that has guided the choice of colors for over 200,000 years. We will have to wait for the Upper Paleolithic to give color an aesthetic value and use it as the first semiotic tool of the human species. Looking at the first cave paintings actually known, those in the caves of Chauvet in France dated 36,000 years old, it is possible to notice that they are monochrome, composed only of the earth red and the coal black (Fig. 1).

Fig. 1 Cave drawings, pigment on rock, about 30 000 BC, Chauvet cave, Vallon Pont d'Arc, Ardèche, France; image source: https://www.grottechauvet2ardeche.com/;

Indeed, the Homo Sapiens Sapiens palette consisted of red ocher, white clay and black coal, few but essential colors to express complex concepts such as the time duration (the white day, the black night) and life itself (indicated by red color of the blood and of the

earth).[4] Though, considering the whole prehistoric art from a distance – like Berlin and Kay did – it could be reproduced with only three colors, red, white, black. All other tones were perceived as variations of these three dominant and sovereign colors. Consider that the Homer himself never refers, in Iliad or in Odyssey, to the word *blue*, but defines the sea as *dark burgundy*.[5] Perhaps, in the VIII century b. C. blue was still perceived as a variation of red with dark brown tones.

Therefore the first words for color – black and white – were only related to their physical agent – light or darkness – on the human visual perception. The first color purely defined as such is red classified as *colored* or different from light or dark. All the other colors – green, blue, yellow, purple – are initially related to the material from which derived – e.g. lapis lazuli = blue in Egyptian or cornflower = blue in ancient Greek. Only much later they are considered colors in themselves, namely linguistically encoded abstract concepts. The linguistic identification of color as such – or categorical notion – arises from the contrast or distinction of it from the two congenital colors – black and white. Every other chromatic variation of light – which are the colors – is, indeed, physiologically inherent but its development and definition is determined by an experiential learning dependent on the specific context.[6]

Color perception or color verbalization

The word – concept link shows once again that, despite a unique and universal presence of colors throughout the world, the linguistic element plays a fundamental role in their perception and in the subsequent cataloging process. For example, although both the Russians and the English easily identify the blue color, for the former this shade appears to be described with a much larger linguistic vocabulary than that used by the English. This is evidenced by the presence in the Russian language of a word for each shade of blue: if in fact for the English speakers the sky and the water are simply labeled as "blue", for the Russians sky corresponds to *голубой*, while water to *синий*.[7] The fundamental difference is not that English speakers cannot distinguish between light blue and dark blue, but rather that Russian speakers cannot avoid distinguishing them: they must do so to speak in Russian properly. This communicative requirement seems to induce the Russians to habitually make use of this distinction, even when they perform a perceptive task that does not require language involvement. The fact that the Russians show a color category linguistic advantage – in normal viewing conditions and in spite of spatial interference - suggests that the categorical representations specific to the language are normally connected with perceptual decisions. Finally, these data show that the performance of color variance differs between language groups depending on which perceptual distinctions are usually made in a given language.

[4] Howell Edwards, John M. Chalmers, *Practical Raman spectroscopy and complementary techniques*, in Idd., *Raman spectroscopy in archaeology and art history*, London, Royal Society of Chemistry, 2005, pp.41-67.
[5] John Noble Wilford, *Homer's Sea: Wine Dark?*, «The New York Times», Retrieved June 23 2016, <https://www.nytimes.com/1983/12/20/science/homer-s-sea-wine-dark.html>.
[6] David Alan Warburton, *Ancient color categories*, in *Encyclopedia of color science and technology*, Luo Ming Ronnier (ed.), Berlin, Springer, 2016, pp. 24-31.
[7] Jonathan Winawer *et al.*, *Russian blues reveal effects of language on color discrimination*, «Proceedings of the National Academy of Sciences», 104, 19, 2007, pp. 7780-7785. Nathalie Henry Riche *et al.* (eds.), *Data-driven storytelling*, Boca Raton, CRC Press, 2018.

In short, it is possible to argue that the attribution of a linguistic label to an abstract categorical concept – like the one of color – is based on the contrast/ distinction with the other two primary white and black shades, or with the presence or absence of light. Every other chromatic variation of light can be considered as inscribed in our physiology, but at the same time it is also the result of experiential learning that took place in a specific context. To reconfirm the habitat role, in the last few years has been developed the Period Eye concept to define the cultural modulation of the perceptive attention of every human being according to where, how, when and with whom he was born and raised.[8] In fact, although the human eye is technically able to perceive all the colors between 400 and 700nm, it notices only those that one's vital experience has led him to know and to become familiar with. This adaptation to the context means that the member of an Australian savannah tribe is able to distinguish even very minute shades of green, in the green-ocher strip, invisible to the inhabitant's eye of a monochrome and gray metropolis like Milan, but at the same time it makes the same indigenous blind to the blue color, since, except the sky, it is not present in any other element of their habitat.[9] The human eye and the environmental context interaction has an even greater effect on the types of creative expression. It is sufficient to analyze the artistic production of the Italian Renaissance to evidence it: in fact, it is possible to notice how the venetian lagoon's innumerable gleams and the international trade's polychromy have favored the chromatic hegemony that characterizes the Tiziano and Giorgione's painting as *tonal*. Contrary, Michelangelo's statuary and hyperrealist *linear* canons were generated in contact with Florence, a city with straight urban architectural profiles and distinguished by the famous and monochrome *bugnato*.

On the other hand, it is the comparison between the waters of the Venetian lagoon, Tiziano's draperies and Giorgione's armor that make stylistic differences clear and provide the tools to understand the artists' choices in relation to the ecosystem in which they matured (Fig. 2). After all, at least at that period, for the artwork's color definition was necessary that it shared a good number of common characteristics with the environmental entities in which the painter operated. Only in this way, in opinion of John Onians, founder of the so-called Neuroarthistory, it could be possible to explain the differences between the Venetian lagoon's polychromy depicted by Titian and the mathematical architectural regularity of Michelangelo's Florence, since the association between environmental familiarity and art would contribute to the dopamine release in the observer's brain, provoking a condition of marked pleasure.[10]

[8] John Onians, *European Art: A Neuroarthistory*, New Haven, Yale University Press, 2016, p.20.
[9] Debi Roberson *et al.*, *Colour categories and category acquisition in Himba and English*, «Progress in colour studies», 2, 2006, pp. 159-172.
[10] Onians, *op. cit.*, p. 247.

Fig. 2 Detail: Giorgio da Castelfranco detto Giorgione, Portrait of a warrior with a squire (1502-1510), Galleria degli Uffizi, Firenze; Tiziano Vecellio, Portrait of Paolo III Farnese (1543), Museo nazionale di Capodimonte, Napoli; Photograph of the Venice lagoon, Author's private archive; image source: https://www.uffizi.it/; http://www.museocapodimonte.beniculturali.it/;

While the artist's thought and speech are able to influence the chromatic orientation and the shades choice, it is equally important that the Period Eye mechanism - the result of robust neural connections due to intense and persistent display to the habitat tonalities - guides the hand during the artwork production.

The categorization of colors was, till the few last decades, used as a probative measure to investigate the degree to which culture, through language, influences thought. While it is known that different cultures use different groups of linguistic categories to describe the visible range of colors, many researchers support the idea that there is a particular set of basic categorical colors, shared among all humans, called basic color terms (Basic Color Terms) and deriving from the structure of the visual system.[11] These basic categories (red, green, blue, yellow, black, white, gray, pink, orange, purple and brown) are considered distinct from other terms (e.g. turquoise or brown) because they are known to all community members and generally referred to as mono-lexemic words.[12] Therefore, according to this position, the concern of color cognitive representations is perception constrained, even if the linguistic color categories' organization varies widely.

Indeed, a growing body of empirical research demonstrates the multiplicity of cognitive domains modeled by the specific interaction between culture, language and thought. For example, the numerical systems variations are mirrored by differences in calculation reasoning,[13] the space-time categories are influenced by the different perception of time,[14] the categorical judgments for the artifacts' types arise in line with the semantic categories

[11] Edward Munnich, Barbara Landau, *The effects of spatial language on spatial representation: Setting some boundaries*, «Language in mind: Advances in the study of language and thought», 2003, pp. 113-155.
[12] Paul Kay, Brent Berlin, William Merrifield, *Biocultural implications of systems of color naming*, «Journal of Linguistic Anthropology», 1, 1, 1991, pp. 12-25.
[13] Stephen C. Levinson, *Language and cognition: The cognitive consequences of spatial description* in Guugu Yimithirr, «Journal of Linguistic Anthropology», 7, 1, 1997, pp. 98-131.
[14] Lera Boroditsky, D*oes language shape thought?: Mandarin and English speakers' conceptions of time*, «Cognitive psychology», 43, 1, 2001, pp. 1-22.

etc.[15] Therefore, the evidence of the close links between culture, language and thought would make color a unique field of classification, if the cognitive color categories can be truly independent of the terms used to describe them. A series of recent interdisciplinary studies on the colors' categorization show consistent differences in a variety of perceptive and memory tasks, linked to the color categories in each culture. Lately, it has been shown that, although two linguistic coding systems may seem very similar, the speakers of bough languages codify, remember and discriminate color stimuli in different ways.[16]

Consequently, the lack of a word for a color does not prove the impossibility of seeing it (and therefore defining it), but of seeing it with a different attention. For example, the large number of Namibia tribe Himba's linguistic codes for the green color – absorbing the blue chromatic category – determines a greater perceptive capacity for this color and a less attention for the blue one.[17] A divergence that is defined by a different perceptual experience, namely a different Period Eye. The Kunene region's flora and fauna, in which the Himba tribe has always lived, is characterized by two colors' predominance – a red ocher background with a sparse green vegetation. With the passing of the centuries the eye 'adapts' to this environment – which does not change even from any anthropogenic factors like in the developed world – and the Himba paints his body of ocher to blend in with the environment and trains his eye to the recognition of the elements contrasting of the green shades. Similarly, it's not a struggle for Londoner to identify the many shades of gray - the predominant color in the English metropolis. It is about a preference not only for color, but for its concrete perception (visual identification). The environment we live in defines not only which colors we prefer but also to which we actually pay cognitive attention and to which we attribute different linguistic codes.

[15] Barbara C. Malt, Eric C. Johnson, *Artifact category membership and the intentional-historical theory*, «Cognition», 66, 1, 1998, pp. 79-85.
[16] Roberson *et al.*, *op. cit.*, p. 170.
[17] Ivi, p. 165.