

Color Culture and Science
Cultura e Scienza del Colore



CCSJ

Vol. 18

N. 1

2026

ISSN

2384-9568

COLOR CULTURE AND SCIENCE Journal
CULTURA E SCIENZA DEL COLORE
CCSJ

jcolore.grupodelcolore.it

ISSN 2384-9568

DOI: 10.23738/CCSJ.00

ANCE: E227716

Registrazione Tribunale di Milano n. 233: 24/06/2014

ANVUR Agenzia Nazionale Valutazione sistema Universitario e Ricerca

APeJ Academic Publications eJournal

BASE Bielefeld Academic Search Engine

DBH Database for statistikk om høyere utdanning

DOAJ Directory of Open Access Journals

EZB Elektronische Zeitschriftenbibliothek Regensburg

JURN Search tool for open access content

ROAD Directory of Open Access scholarly Resources

SCOPUS

ZDB Zeitschriftendatenbank

Volume 18, number 1, April 2026

DOI 10.23738/CCSJ.180100

PUBLISHER

Gruppo del Colore – Associazione Italiana Colore

www.grupodelcolore.org

Registered office: Piazza Carlo Caneva, 4 - 20154 Milan (IT)

PEER REVIEW PROCESS

All articles submitted to the Color Culture and Science Journal are peer-reviewed according to the following procedure:

First review level

The Associate Editors evaluate each article to determine if the topic and content are of interest to the journal. Once the article passes the initial review, the Associate Editors select several reviewers from the Editorial Board based on their expertise in a particular subject area or topic.

Second review level

Two or three experts review each article with a blind peer-review process where the reviewers are kept anonymous. Reviewers are asked to evaluate the manuscript based on the following criteria:

- Originality
- Relevance to journal's aims and scope
- Technical merit and/or validity
- Soundness of methodology
- Completeness of the reported work
- Conclusions supported by the data
- Correct acknowledgment of the work of others through reference
- Effectiveness of the manuscript (organization and writing)
- Clarity of tables, graphs, and illustrations
- Importance to color researchers
- Relevance to color practices

If the article is accepted with major revisions, the author(s) are asked to improve the article according to the reviewers' suggestions. The revised article will then be submitted for further review. After collecting the reviewers' reports, the Associate Editors recommend the acceptability of the article to the Editor-in-Chief.

EDITOR-IN-CHIEF

Maurizio Rossi (Politecnico di Milano, IT)

DEPUTY EDITOR

Alice Plutino (University of Amsterdam, NL)

ASSOCIATE EDITORS

José Luis Caivano (Universidad de Buenos Aires, AR)

Vien Cheung (University of Leeds, UK)

Marco Gaiani (Alma Mater Studiorum Università di Bologna, IT)

Robin Kingsburgh (York University Toronto, CA)

Agata Kwiatkowska-Lubańska (Academy of Fine Arts, Kraków, PL)

Marcello Picollo (IFAC-CNR, IT)

Verena M. Schindler (Chair AIC S.G. Environmental Colour Design, CH)

Renzo Shamey (NC State University, USA)

EDITORIAL BOARD MEMBERS

The complete and updated list of the Editorial Board Members for the peer review process is available on the CCSJ website: <http://jcolore.grupodelcolore.it/ojs/index.php/CCSJ/about/editorialTeam>

TOPICS / DISCIPLINES

The CCSJ accept papers on a wide range of topics on color, including and not limited to the following:

1. Color and Measurement/Instrumentation. Colorimetry, photometry and color atlas: method, theory and instrumentation; quality control and food coloring, dyes, organic and sustainable color.
2. Color and Digital. Reproduction, management, digital color correction, image processing, graphics, photography, film and video production, printmaking and 3D print, artificial vision, virtual reality, multispectral imaging, data visualization. Light field imaging. Multi-sensor fusion. Color localization, recognition, HDR imaging, ADAS systems.
3. Color and Lighting. Metamerism, color rendering, adaptation, color constancy, appearance, illusions, color memory and perception, color in extra-atmospheric environments, lighting design, lighting technologies, visual comfort.
4. Color and Physiology. Mechanisms of vision in their experimental and theoretical aspects, color vision and color appearance, deficiencies, abnormalities, clinical and biological aspects, synesthesia, health, well-being.
5. Color and Psychology. Phenomenology of colors, color harmonies, color & form, perceptive, emotional, aesthetic, and diagnostic aspects.
6. Color and Production. Food and beverages, agriculture, textiles, plastic materials, ceramics, paints, gemology, color in the food industry.
7. Color and Restoration. Archaeometry, painting materials, diagnostics, and conservation techniques, restoration, and enhancement of cultural heritage.
8. Color and Environment. Representation and drawing, urban planning, the project of color, architecture, interior design, landscapes & horticulture, color and architectural syntax, territorial identities, biodiversity.
9. Color and Design. Furniture, CMF design, fashion, textiles, textures, cosmetics, food design, museography.
10. Color and Culture. Arts and crafts, history, philosophy, aesthetics, ethno-anthropology, graffiti, geology, sociology, lexicology, semantics, anthropology of vision, food culture and heritage, color naming.
11. Color and Education. Pedagogy, didactics of color, aesthetic education, artistic education.
12. Color and Communication/Marketing. Graphics, communication, packaging, lettering, exposure, advertising.

Table of Contents

A Shared Journey in Colour – Deputy Editor's note <i>Alice Plutino</i>	5
An unsupervised method to increase film color restoration sustainability for small cinematheques <i>Giovanni Vanoglio, Alessandro Rizzi</i> DOI: 10.23738/CCSJ.180101	7
The illusion of color: the chromatic interactions of Josef Albers in 3D spaces <i>Daniele Calisi, Stefano Botta</i> DOI: 10.23738/CCSJ.180102	14
The black background in advertising posters: some examples from the early decades of the 20th century <i>Marcello Scalzo</i> DOI: 10.23738/CCSJ.180103	21
Chromatic Imperfection: Reimagining Colour as a Catalyst for Sustainable Fashion Design <i>Ingrid Calvo Ivanovic, Erminia D'Itria</i> DOI: 10.23738/CCSJ.180104	30
Marbled is the new green. Polymeric polychromy as a contemporary code of sustainability. <i>Ivo Caruso, Susanna Parlato, Iole Sarno</i> DOI: 10.23738/CCSJ.180105	42
From Functionalism to Eclecticism: the impact of design movements on colour <i>Alessandro Spennato, Jacopo Battisti</i> DOI: 10.23738/CCSJ.180106	52

Chromatic Analysis of the Collective Unconscious: Analytical Psychology Applied to the Art of Antônio
Bandeira 61

José Eduardo Vilas Bôas, Maria Silvia Barros de Held

DOI: 10.23738/CCSJ.180107

Film Laboratory Manuals as Sources for the Reconstruction of Colour in Silent Film Restoration 68

Valentina Rossetto

DOI: 10.23738/CCSJ.180108

Monitoring Colour Usage in Italian Municipal Web Interfaces 77

Enea Ahmedhodzic, Beatrice Sarti, Andrea Mario Trentini

DOI: 10.23738/CCSJ.180109

A review on Colour, Material and Finish Design: meaning, state of the art and research perspective 87

Lia Sossini, Ingrid Calvo Ivanovic, Barbara Del Curto

DOI: 10.23738/CCSJ.180110

Light and Color in Low-Arousal Design: a Review Towards Inclusive Sensory Environments for Neurodiversity 99

Paola Bertoletti, Maurizio Rossi

DOI: 10.23738/CCSJ.180111

Colour as Mediator: Perception, Materiality, and Technology in Contemporary Visual Culture 108

Alice Plutino

DOI: 10.23738/CCSJ.180112

A Shared Journey in Colour

Deputy Editor's note

Dear Readers,

This new issue of Color Culture and Science Journal once again reminds us why colour is such a wonderfully stubborn subject: it refuses to stay in one place. The contributions collected here move across perception, design, heritage, digital practices, and sustainability, showing, yet again, that colour is never “just” an aesthetic choice. It is a way of thinking, measuring, designing, preserving, and sometimes even arguing (politely, of course). Seeing these different perspectives meet in the same issue is one of the quiet pleasures of working on this journal.

This issue also comes with a small personal announcement. After several years as Deputy Editor of CCSJ, it is time for me to step aside from this role. It feels a bit strange to write this, partly because time has flown, and partly because being an editor is one of those jobs you only fully appreciate once you realise how many emails, spreadsheets, and last-minute miracles it involves. Looking back, it has been a genuinely rewarding experience: helping to grow the journal, welcoming new reviewers and editors into the team, and contributing to milestones that once felt rather ambitious, such as seeing CCSJ indexed in Scopus. That achievement, in particular, is a collective one, and I am proud to have been part of the journey that led us there.

I am not going very far, though. I will continue to serve the journal as an Associate Editor, which means I still get to read interesting papers, work with great colleagues, and occasionally worry about deadlines, just in slightly different proportions.

I would like to thank, from the bottom of my heart, the people who first introduced me to CCSJ, those who mentored me along the way, and all the colleagues who have worked patiently, generously, and always on a voluntary basis to keep this journal alive and growing. CCSJ is very much a community project, built on shared commitment, curiosity, and a remarkable amount of goodwill. Working together in this spirit has been one of the most enjoyable parts of this experience, and, yes, also one of the most human ones.

Finally, thank you to the authors, reviewers, editors, and readers who continue to trust and support the journal. I am confident that Color Culture and Science Journal will continue to evolve as an open, interdisciplinary, and lively forum for colour research, and I am very happy to remain part of that story.

Best Wishes,

February 2026
The Deputy Editor Alice Plutino, PhD

This page was intentionally left blank.

From Functionalism to Eclecticism: the impact of design movements on colour

Alessandro Spennato, Jacopo Battisti

Department of Architecture, University of Florence, Italy. alessandro.spennato@unifi.it, jacopo.battisti@unifi.it

Corresponding author: Alessandro Spennato (alessandro.spennato@unifi.it)

ABSTRACT

This article examines the evolution of colour use in fashion and design, beginning with 20th-century Functionalism and concluding with contemporary 21st-century Eclecticism. Throughout the 20th century, artistic and cultural movements profoundly influenced the role of colour, changing aesthetic preferences and shaping collective taste. From Bauhaus and Modernism, which conceived colour as a functional element subordinate to form, to Postmodernism and Eclecticism, which re-evaluated colour as a means of expression and symbol of identity, the socio-cultural context has shaped how colour has been used in design and fashion. The aim is to critically examine the evolution of colour in design and fashion, analysing how different design movements have influenced colour trends and assessing how social and cultural changes have contributed to redefining the use and perception of colour. Through a systematic review of the literature, interviews, and case studies of iconic stylists and designers, the work aims to understand the connections between design, fashion, and culture, as well as the role that colour has played in this process of evolution. The method adopted combines a review of the literature with a qualitative analysis of visual materials and historical documents, as well as an analysis of public statements and interviews already available in the literature. Comparative analysis, thematic analysis, and contextual analysis were employed to explore the use of colour across different historical periods, highlighting the connections between artistic movements and shifts in society's colour preferences. Data triangulation enabled the validation of the results, providing a comprehensive view of colour evolution. The results show that colour, initially relegated to a functional role during Functionalism and Modernism, gradually took on an expressive role during Postmodernism and contemporary Eclecticism. This transition reflects cultural and technological changes that have influenced aesthetic taste and the use of colour as a tool for communication and identity. The analysis also highlighted the importance of sustainability and technological innovations in determining new colour trends. In conclusion, the evolution of colour use in fashion and design reflects a dynamic process influenced by social, cultural and technological factors. Colour has evolved from a simple functional element to a powerful means of expression, capable of communicating identity and cultural values, thereby contributing to the redefinition of contemporary design's aesthetic paradigms.

KEYWORDS Colour evolution, Fashion, Design, Artistic movements, Cultural identity

RECEIVED 24/06/2025; **REVISED** 01/07/2025; **ACCEPTED** 04/11/2025

1. Introduction

The relationship between design and fashion is not limited to the aesthetic conception of objects and clothing, but also extends to the use of colour, one of the most powerful tools in a designer's or stylist's arsenal. The 20th century witnessed the emergence of a series of artistic and philosophical movements that shaped the use of colour, starting with rigorous Functionalism, characterised by chromatic economy, and ending with contemporary Eclecticism, which celebrates variety and chromatic expressiveness. As Margolin (2017) and Coles (2019) point out, colour in design and fashion has always reflected cultural and technological demands, representing a mirror of a changing society. The history of colour in design and fashion is intimately linked to the social, economic and cultural transformations that have characterised each historical period. The Bauhaus movement, founded in Germany in 1919, played a crucial role in defining the use of colour in 20th-century design. At the Bauhaus, colour was considered a functional element, capable of improving the understanding of objects and creating a sense of visual order (Wick, 2000). This approach reflected the desire to attribute a rational function to colour, as also highlighted by Albers and Itten, whose systematic studies on visual perception influenced the entire Bauhaus colour teaching programme (Margolin, 2017). From a broader perspective, Branzi (2006) emphasises how contemporary design also derives from Modernism's ability to systematise visual languages and codes.



Fig. 1. Original poster from the 1923 Bauhaus exhibition, which uses basic geometric shapes and primary colours to

emphasise the functionality and visual simplicity typical of Functionalism. (<https://popmotif.com/products/bauhaus-ausstellung-1923-circles-exhibition-poster>)

Johannes Itten (1888–1967) and Josef Albers (1888–1976), both teachers at the Bauhaus, developed colour theories that aimed to systematise the use of colour, limiting themselves to primary colours to emphasise the functionality and visual effectiveness of objects and spaces (Margolin, 2017). As Gage (1999) observes, the colour theories developed at the Bauhaus were not only teaching tools. However, they reflected a broader cultural vision in which colour took on symbolic and psychological meanings as well as functional ones. More recently, some studies have even proposed innovative models of colour perception based on mathematical and theoretical approaches, such as the quantum theory of colour oppositions (Berthier & Provenzi, 2025).

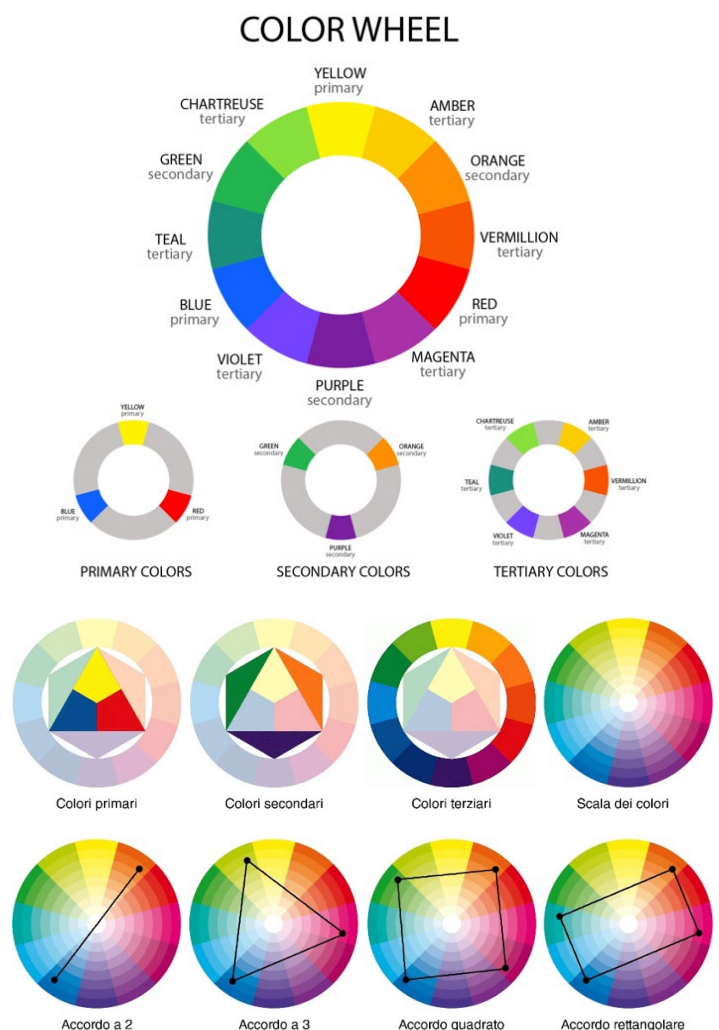


Fig. 2. The color wheel by Johannes Itten (<https://www.color-meanings.com/color-wheel-theory-complementary-colors>)

This view of colour as a rational and functional component reflected the principle that form should follow function, in line with the modernist approach to design. In the years that followed, Modernism further developed this approach. The Modernist movement advocated a minimalist and reduced vision of colour, using neutral shades and limiting the colour palette to emphasise the simplicity and purity of forms. This period saw the emergence of figures such as Le Corbusier, who used colour sparingly, often to create structural contrasts and highlight the architectural elements of buildings (Coles, 2019). In the world of fashion, too, Modernism influenced the use of colour: Coco Chanel, for example, introduced a monochromatic palette of black and white, a symbol of elegance and simplicity, which reflected the essential and functional trends in design at the time. With the advent of Postmodernism in the 1970s and 1980s, colour took on a whole new dimension, becoming a symbol of rebellion against the rigid rules of Modernism. Postmodern designers, such as Ettore Sottsass and the Memphis group, challenged the austerity of Modernism by introducing a range of bright and playful colours, often combined in seemingly discordant ways to create a sense of surprise and irony (Hauffe, 2021).



Fig. 3. A Carlton, a bookcase designed by Ettore Sottsass in 1981 for the Memphis group: an explosion of contrasting shapes and colours as an ironic break with modernist austerity.
(https://commons.wikimedia.org/wiki/File:Ettore_sottsass_per_memphis_srl._libreria_carlton._milano_1981.jpg)

Postmodernism has therefore rehabilitated colour as a tool for personal expression and social criticism, celebrating

complexity and eclecticism in contrast to the modernist emphasis on simplicity (Fiell & Fiell, 2020). As Batchelor (2000) observes, Western culture has long harboured a distrust of colour, perceived as superficial, feminine or decorative. Postmodernism broke with this tradition, restoring colour to a central role in defining identity and criticising modernist paradigms. Postmodernism also profoundly influenced the use of colour in fashion. Designers such as Vivienne Westwood and Jean-Paul Gaultier used intense colours and bold combinations to challenge conventions and celebrate individuality and non-conformity.



Fig. 4. Vivienne Westwood SS21 Editorial. A vibrant palette and unusual colour combinations (lilac and yellow): an emblematic example of postmodernist rebellion against canonical colour rules and individual expressive exploration.
(<https://vogue.globo.com/desfiles-moda/noticia/2020/09/vivienne-westwood-londres-verao-2021.html>)

This trend was also reflected in the fashion collections of the 1980s, characterised by an explosive use of colour,

often in deliberate contrast to the rules of traditional elegance (Geczy & Karaminas, 2018). In the 21st century, with the advent of contemporary eclecticism, colour has become an even more diverse and inclusive element. Eclecticism celebrates the mixing of styles and cultural influences, and colour has been used to express this variety and to represent different cultural identities. Globalisation has led to the discovery and adoption of colours and colour combinations from non-Western cultures, enriching the colour palette of contemporary design and fashion (Quinn, 2019). From this perspective, anthropological studies have demonstrated how traditional clothing and colour systems in non-Western cultures constitute not only an aesthetic repertoire but also a language of identity and symbolism (Küchler & Were, 2005). The work of designers such as Dries Van Noten and Riccardo Tisci reflects this trend, with the use of vibrant colours inspired by global cultures that emphasise diversity and freedom of expression. These European experiences are complemented by equally significant global contributions, such as the technological approach of Issey Miyake and Rei Kawakubo in Japan, the colour palettes linked to Indian tradition by Manish Arora, and the use of Caribbean and Latin American tones in the collections of Oscar de la Renta. These examples confirm that contemporary chromatic eclecticism [1] is a genuinely transnational phenomenon. Interest in natural materials and sustainable dyeing techniques has led to a return to earthy colours and organic shades, evoking a connection with nature and an ecological sensibility.

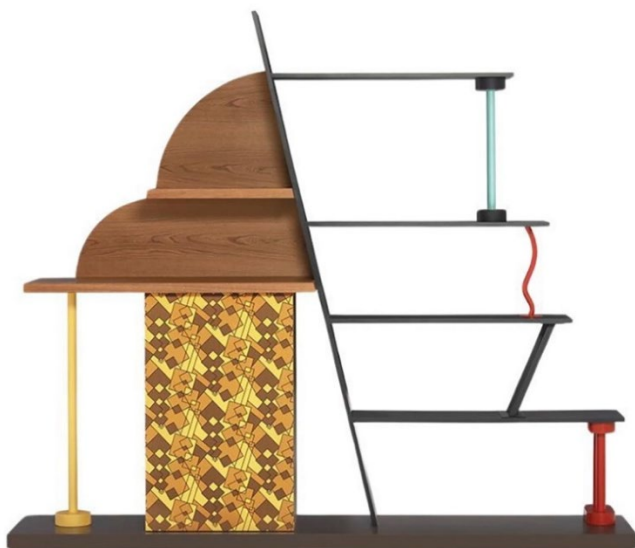


Fig. 5. Sideboard 'Malabar' (1982), another Memphis piece: earthy colours and organic shapes, anticipating the transition to Eclecticism and an interest in natural dyes. (https://www.1stdibs.com/it/arredi/armadi-e-contenitori/stipi/credenza-malabar-di-ettore-sottsass-per-la-collezione-memphis-milano/id-f_24109522/)

This change responds not only to aesthetic needs but also to a growing awareness of the environmental impact of colour choices and production processes. The evolution of colour use in design and fashion reflects the social, cultural and economic transformations that have characterised the 20th and 21st centuries. Colour, once a functional element subordinate to form in Functionalism, has become a powerful means of expression and a symbol of cultural and individual identity, celebrated in contemporary Eclecticism. This work analyses these transformations, highlighting the interactions between various design movements and their impact on colour trends in fashion, emphasising how colour has been used to communicate values and profound meanings in every historical phase (Margolin, 2017; Coles, 2019; Hauffe, 2021).



Fig. 6. Vivienne Westwood SS21. A palette of natural tones and unexpected combinations that reflect a contemporary approach to colour sustainability. The dress mixes textures and colours in an expressive, symbolic and identity-defining way. (<https://vmagazine.com/article/vivienne-westwood-evokes-the-french-rococo-with-autumn-winter-21-collection/>)

2. Objective

The aim is to critically examine the evolution of colour use in fashion and design from the 20th to the 21st century, starting with Functionalism and concluding with contemporary Eclecticism. Specifically, the article aims to understand how design movements have influenced colour trends in fashion, how ideological changes in aesthetic concepts have shaped society's taste in colour, and what role colour plays in communicating social, cultural, and identity values. This study aims to highlight the connections between design and fashion, exploring how artistic movements have influenced colour preferences and the role of colour as both a symbolic and functional element (Coles, 2019; Margolin, 2017). Another fundamental objective is to investigate how social, economic and cultural transformations have interacted with colour trends, influencing the way colour is perceived and used in the context of fashion and design (Quinn, 2019).

3. Method

To develop a critical and comprehensive analysis, a qualitative approach was adopted, based on a systematic review of academic literature and the analysis of selected case studies. The selection of historical movements reflects a predominantly Eurocentric perspective, focusing on Western designers and trends. This choice was motivated by the need to maintain a focus consistent with the evolution of modern and contemporary design in Europe and North America, while leaving room for future cross-cultural explorations. The literature review included recent academic texts, articles from specialised journals and publications on design and fashion movements. The analysis also drew on museum exhibition catalogues and fashion collections from recent decades to establish a solid foundation of historical and contemporary data (Margolin, 2017; Fiell & Fiell, 2020). The main historical movements analysed include Bauhaus, Modernism, Postmodernism and contemporary eclectic movements, to explore how each of them contributed to the chromatic evolution in design and fashion (Branzi, 2006; Hauffe, 2021). A key aspect of the method was the use of comparative analysis to understand the differences and similarities in the use of colour between various design and fashion movements. This approach made it possible to identify recurring patterns and significant differences in the adoption of colour as an expressive and functional element. In addition, specific case studies of stylists and designers were selected, including prominent figures such as Vivienne Westwood and Ettore Sottsass, who incorporated the chromatic influences of historical movements into their work (Geczy & Karaminas, 2018).

The qualitative approach also included documentary analysis of public statements by contemporary designers, collected from secondary sources, previously published interviews and museum catalogues, as well as an examination of visual materials such as photographs of fashion collections and design works, in order to understand the practical application of colour theories (Sudjic, 2020). The analysis of secondary sources was supplemented with historical and theoretical references to trace a complete picture of the evolution of colour from Functionalism to contemporary Eclecticism. In addition, the method included thematic analysis, which allowed for the identification of recurring themes and emerging trends in the use of colour. Thematic analysis was useful for understanding the dynamics underlying colour choices in different historical periods and for highlighting the differences between design and fashion in terms of colour use. This was conducted using a mixed approach, combining inductive coding, which emerged directly from the data collected, with deductive coding, based on theoretical frameworks already established in the study of colour (e.g. Arnheim and Itten). The sources analysed included academic articles, published interviews, museum catalogues and critical texts relating to design and fashion. This procedure was inspired by the methodological model proposed by Braun and Clarke (2006), who define thematic analysis as a flexible method useful for identifying and interpreting recurring patterns within qualitative data. The approach also facilitated the identification of possible connections between artistic movements and changes in society's colour preferences (Quinn, 2019). An additional element of the method was the use of contextual analysis, which took into account the socio-cultural and technological context of each historical period. This analysis provided a better understanding of how external factors, such as industrialisation, globalisation and the growing focus on sustainability, have influenced colour choices in design and fashion. The contextual analysis was developed from a corpus of historical and contemporary sources, including texts on the history of design and fashion, exhibition catalogues, articles from specialist magazines and fashion collections. The time frame considered ranges from 1919, the year the Bauhaus was founded, to 2023, thus including both the origins of Functionalism and the most recent manifestations of chromatic Eclecticism. The approach adopted was interpretative in nature, aiming to relate socio-technical factors — such as industrialisation, globalisation, attention to sustainability, and technological innovation — to colour choices in the design and fashion sectors. In this way, it was possible to highlight how colour is not only an aesthetic element, but also reflects long-term cultural, social and economic transformations. The contextual analysis highlighted the importance of historical context in

the evolution of colour trends, demonstrating how colour has been used to respond to constantly changing social needs and values (Margolin, 2017). The thematic analysis followed a mixed approach, combining inductive coding (emerging from the data) and deductive coding (based on existing colour theories, such as those of Arnheim and Itten). The sources subjected to thematic analysis include academic articles, published interviews and museum catalogues. The contextual analysis covered sources chronologically between 1919 and 2023, including exhibitions, critical articles and fashion collections. The approach was interpretative, aimed at articulating social, cultural and technological factors with the evolution of colour choices. The method also involved data triangulation, combining multiple sources of information to

ensure greater validity and reliability of the results. Triangulation was intended not only as a validation mechanism, but also as an epistemological tool to integrate different points of view and deepen the relationships between design, society and colour. This approach enabled the construction of a more comprehensive and multifaceted view of colour evolution in design and fashion, thereby reducing the risk of bias and enhancing the robustness of the conclusions drawn (Fiell & Fiell, 2020; Sudjic, 2020). To facilitate understanding of the results, a comparative table was drawn up summarising the evolution of colour use in the main design movements and its impact on fashion. The table compares the chromatic characteristics, the function attributed to colour, and some emblematic examples in the two fields.

Period / Movement	Use of colour	Colour range	Function of colour	Examples in design	Examples in fashion
Functionalism (Bauhaus, 1920s–1930s)	Rational, subordinate to function	Primary colours	Facilitating legibility, visual order	Albers, Itten, functional objects	Chanel: essential black and white
Modernism (1930s–1960s)	Restrained, minimalist	Neutral and monochrome	Emphasise form, reduce the superfluous	Le Corbusier: monochrome architecture	Understated fashion, pure lines
Postmodernism (1970s–1990s)	Expressive, ironic, provocative	Bright, discordant colours	Identity and critical tool	Sottsass, Memphis	Vivienne Westwood, Jean-Paul Gaultier
Contemporary eclecticism (2000s–present)	Inclusive, multicultural	Vibrant, ethnic, earthy tones	Visual storytelling, sustainability, emotion	Dries Van Noten, hybrid design	Riccardo Tisci, global and sustainable fashion

Table: summary of results by historical period.

4. Results

The analysis conducted revealed that the use of colour in design and fashion has undergone significant changes, influenced by the aesthetic philosophies of the major movements of the 20th and 21st centuries. During the Functionalism period, particularly with the Bauhaus, colour was conceived in terms of function and efficiency. The use of colour was essential and reduced, often limited to a few primary colours to emphasise the simplicity and functionality of objects and clothing. This approach stemmed from the belief that design should serve a practical function and that colour should contribute to that function rather than being a decorative element. For example, the exhibition “Fashioning Colour” (V&A Museum, 2021) documented the provocative use of colour by postmodern designers such as Westwood and Castelbajac, demonstrating the communicative effectiveness of colour saturation. With the transition to Modernism and, later, Postmodernism, the use of colour in fashion and design began to diversify. Designers began to perceive colour as a tool for communicating emotions, creating identity and breaking with established conventions (Sudjic, 2020). In the 1960s and 1970s, for

example, colour took on a revolutionary dimension: vibrant and contrasting tones were a symbol of rebellion and renewal, both in fashion and interior design. This period marked the beginning of a phase in which colour was no longer simply functional, but took on an expressive and symbolic connotation. An innovative approach mapped these relationships between colour and emotion in art, using fuzzy models to interpret perceptual and cultural variability (Muratbekova & Shamoï, 2023).

Nanotechnology has introduced light-reactive materials, such as photochromic and thermochromic pigments, capable of changing their colour based on environmental stimuli. At the same time, bright inks allow the creation of dynamic surfaces, where colour palettes can vary over time and space, radically transforming the concept of colour in design. These innovations have expanded the range available to creatives, allowing for palettes that are no longer static but programmed to adapt to different contexts and interactions (Shamoï et al., 2023; Forni et al., 2025). It is also important to remember that the colours of artefacts preserved in museums undergo alterations over time. To preserve their original colour fidelity, it would be desirable to digitise them using spectrophotometric

scanners at the time of creation, thereby guaranteeing the authenticity of the future colour experience.



Fig. 7. Vivienne Westwood, Spring 2020 Ready-to-Wear. Shocking tones such as orange and red, irregular graphics and visual layering: a collection that iconically expresses the expressive power of colour in postmodern design, in contrast to modernist austerity. (<https://x.com/FollowWestwood/status/1174746083915964418>)

Postmodernism further amplified the use of colour, deliberately breaking with the rules of Modernism and celebrating complexity, irony and kitsch (Hauffe, 2021). Postmodern designers embraced eclecticism, using bold and unexpected colours and combining different styles and cultural references to challenge traditional aesthetic norms. This period saw fashion become a field of colour experimentation, where colour was used to create new identities and challenge conventional taste (Fiell & Fiell, 2020). In the 21st century, with the advent of contemporary eclecticism, the use of colour in fashion and design has become even more diverse and free (Quinn, 2019). Globalisation and the influence of non-Western cultures have further enriched the colour palette, bringing to the

fore colours and combinations that were previously considered unconventional or even discordant (Coles, 2019). Contemporary eclecticism celebrates diversity and individuality, and colour has become a fundamental tool for expressing personal uniqueness.



Fig. 8. Vivienne Westwood, Fall 2016. Multi-layered digital printing and complex colour layering: an emblematic example of the integration between technology and visual colour language in contemporary eclecticism. (<https://vogue.ua/ru/collections/vivienne-westwood-red-label-osen-zima-2016-2017-2237.html>)

Furthermore, analysis has highlighted that colour has become a tool for representing evolving social and cultural values. For example, the growing focus on sustainability has led to a preference for natural, earthy colours, which evoke a connection with nature and reflect a commitment to more environmentally responsible practices (Lazzarini, 2022). Contemporary designers use colours to tell stories and communicate messages that go beyond mere aesthetic value, incorporating themes such as sustainability, inclusivity and diversity (Quinn, 2019). Another aspect that emerged from the analysis is the role of technology in expanding colour possibilities in both design and fashion. The introduction of new synthetic pigments and advanced dyeing technologies has enabled designers to explore colour combinations that were

previously impossible. The use of nanotechnology and bright inks now makes it possible to design colours that are no longer limited to pre-established palettes, but are flexible, interactive and customisable. This has had a significant impact on creative processes, introducing an experimental approach in which colour is understood as a dynamic variable, capable of responding to the context and even to the user's emotions (Mirzaei, 2025; Jonauskaitė & Mohr, 2025).

For example, the use of nanotechnology and digital dyeing techniques has expanded the range of colour possibilities, giving designers new tools to experiment with and create innovative visual effects. This has allowed for greater customisation and made colour an even more central element in building the identity of a product or fashion collection. The analysis also highlighted that changes influence the contemporary approach to colour in consumer psychology. Colours are chosen not only for their aesthetic value, but also for their ability to evoke emotions and create an emotional connection with the consumer. This relationship is confirmed by recent studies that have shown how specific colour characteristics (saturation, brightness, hue) are consistently associated with distinct emotions (Jonauskaitė & Mohr, 2025). This is particularly evident in fashion, where the use of colour can influence the perception of a garment and its ability to communicate a message of cultural belonging or social status (Quinn, 2019). Finally, the influence of popular culture and the media has had a significant impact on contemporary colour trends. Fashion and design are no longer influenced solely by artistic movements, but also by digital culture, social media and global trends. Colour is used to create engaging visual experiences and capture the public's attention in a context where image and visual impact play an increasingly important role (Sudjic, 2020).

Furthermore, colour perception today is strongly influenced by artificial light, digital screen rendering and pigment printing, with repercussions on well-being, legibility and the effectiveness of visual communication. Colour harmony has also proved to be a complex and culturally situated phenomenon, which can be described through fuzzy approaches capable of integrating subjectivity and context (Shamoi et al., 2023). The study revealed that the evolution of colour use in design and fashion has been driven by a complex set of factors, including philosophical shifts, technological advancements, cultural influences, and social transformations. Colour has taken on new meanings and functions over time, evolving from a functional element subordinate to form to a powerful means of expression and cultural communication. As Dries Van Noten stated in an interview with *Business of Fashion* (2022): 'Colour for me is identity. It is the first voice that speaks before one even

expresses oneself.' This statement reflects the conscious use of colour as a cultural and personal marker.

5. Conclusions

The evolution of colour use in fashion and design, from Functionalism to contemporary Eclecticism, reflects the social, cultural, and technological transformations of the 20th and 21st centuries. Colour, initially conceived as a functional element subordinate to form, has gradually taken on a central role in defining aesthetics and identity (Margolin, 2017). Design movements have had a significant impact on colour trends in fashion, influencing aesthetic choices and shaping public taste in terms of colour (Sudjic, 2020). The shift from Functionalism, with its essential and rational approach to colour, to contemporary Eclecticism, which celebrates variety and freedom of expression, represents a radical transformation in the way colour has been perceived and used (Coles, 2019). Several factors, including the evolution of aesthetic theories, social and cultural shifts, and technological advancements, have influenced this change. Colour has become a powerful tool for communicating identity, emotions and cultural values, both in design and fashion. In particular, in contemporary graphic design, colour is confirmed as a key element in influencing perception and visual engagement (Mirzaei, 2025). Contemporary Eclecticism, with its celebration of colour diversity, represents the culmination of this evolutionary process, offering new possibilities for expression and challenging traditional aesthetic conventions (Quinn, 2019). This study contributes to the understanding of the role of colour in design and fashion, highlighting how colour trends are the result of a complex interweaving of artistic, cultural and technological influences. Among the limitations of this research are the absence of statistical analysis and the predominance of references to Euro-Western sources. These elements represent a basis for future research that integrates quantitative methods, cross-cultural studies and interdisciplinary perspectives on colour. Further studies could also investigate the perceptual effects of digital technologies, artificial light and environmental variation on colour reading processes. Emerging technologies, such as nanotechnologies and digital inks, open up new scenarios for the use of colour, which, from a static phenomenon, becomes an interactive and multisensory process. These innovations are redefining contemporary colour palettes and stimulating new design methodologies that combine creativity and materials science.

6. Conflict of interest declaration

All authors declare that there are no potential conflicts of interest.

7. Funding source declaration

No source of funding.

8. Short biography of the author(s)

Alessandro Spennato - Research Officer (CEAR08/D) at the Department of Architecture, University of Florence. His research interests include rapid prototyping, generative design, interior and communication design, with a particular focus on lighting, colour and participatory design. He actively participates in numerous interdisciplinary research projects.

Jacopo Battisti - Adjunct professor (CEAR08/D) at the Department of Architecture, University of Florence. Course Leader in Fashion Design at the Istituto Marangoni Florence. His research explores humanitarian architecture, refugee spaces, spatial justice and the decolonisation of fashion archives, exploring inclusive and critical approaches.

Notes

[1] The term 'chromatic' refers to everything related to colour, its perception, classification or use in a visual context. In theory, the concept refers to the qualitative and sensory dimension of colour, as distinct from its purely quantitative aspects (e.g. brightness or saturation).

[2] The term 'kitsch', of German origin, refers to an aesthetic based on elements considered to be in bad taste, often excessively ornamental, sentimental or artificial. In the postmodernist context, kitsch has been re-evaluated in an ironic and deconstructionist key, becoming a deliberately provocative and unconventional language.

Licensing terms

Articles published in the "Cultura e Scienza del Colore -Color Culture and Science" journal are open access articles, distributed under the terms and conditions of the Creative Commons Attribution License (CC BY). You are free to share (copy and redistribute the material in any medium or format) and adapt (remix, transform, and build upon the material for any purpose, even commercially, under the following terms: you must give appropriate credit to authors, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use, you may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Copyright: The authors keep the rights to further publish their contents where they want and can archive pre-print and post-print (submitted version and accepted version) and the published version of the PDF of their article with no embargo period.

References

Batchelor, D. (2000). *Chromophobia*. London: Reaktion Books.

Berthier, M., & Provenzi, E. (2025). The quantum nature of color perception: Uncertainty relations for chromatic opposition. *arXiv*. doi: 10.48550/arXiv.2504.12303

Branzi, A. (2006). *Modernità debole e diffusa. Il mondo del progetto all'inizio del XXI secolo*. Milano: Skira.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. doi: 10.1191/1478088706qp063oa

Coles, A. (2019) *Design and Art: The Interplay of Creativity*. London: Thames & Hudson.

Fiell, C. and Fiell, P. (2020). *The Story of Design*. London: Phaidon Press.

Forni, O., Darmon, A., & Benzaquen, M. (2025). Harmonious color pairings: Insights from human preference and natural hue statistics. *arXiv*. doi: 10.48550/arXiv.2508.15777

Gage, J. (1999). *Colour and Meaning: Art, Science and Symbolism*. Berkeley: University of California Press.

Geczy, A. and Karaminas, V. (2018). *Fashion and Art*. London: Bloomsbury Visual Arts.

Hauffe, T. (2021). *Design: A Concise History*. London: Laurence King Publishing.

Jonauskaitė, D., & Mohr, C. (2025). Do we feel colours? A systematic review of 128 years of psychological research linking colours and emotions. *Psychonomic Bulletin & Review*. Advance online publication. doi: 10.3758/s13423-024-02615-z

Küchler, S., & Were, G. (Eds.). (2005). *The Art of Clothing: A Pacific Experience*. London: UCL Press. doi: 10.4324/9781315066592

Margolin, V. (2017). *World History of Design, Volume 2*. London: Bloomsbury Publishing.

Mirzaei, V. (2025). The impact of color psychology in graphic design: A comprehensive review. *International Journal of Scientific Research and Management*, 13(03), eC04. doi: 10.18535/ijrm/v13i03.ec04

Muratbekova, M., & Shamoï, P. (2023). Color-emotion associations in art: Fuzzy approach. *arXiv*. doi: 10.48550/arXiv.2311.18518

Quinn, B. (2019). *Fashion Futures*. London: Merrell Publishers.

Shamoï, P., Muratbekova, M., Izbassar, A., Inoue, A., & Kawanaka, H. (2023). Towards a universal understanding of color harmony: Fuzzy approach. *arXiv*. doi: 10.48550/arXiv.2310.00791

Sudjic, D. (2020). *The Language of Design*. London: Penguin Random House.

Wick, R. K. (2000). *Teaching at the Bauhaus*. Ostfildern-Ruit: Hatje Cantz Publishers.